Fixation Forceps with ring handles
Sidegal Disc
ing Forceps, with serrated
The above and many other

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AN EXAMINATION OF THE FIELDS OF VISION IN THE LAST WEEKS OF PREGNANCY

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DURING the past few years several investigations have been made regarding the occurrence of bitemporal contraction of the fields of vision associated with pregnancy, with a great discrepancy in results. This variation of opinion led me to examine a series of cases during the last weeks of pregnancy the findings in which are the subject of this thesis.

The position of the optic chiasma was said to be on the optic groove of the sphenoid bone. This statement in recent years has been questioned and is now regarded as being wholly incorrect. Many workers, including Traquair[1], Herbert Fisher[2], etc., have studied the anatomical relations of these parts and have come to the conclusion that the chiasma lies much further back.

Dr. J. Parsons Schaeffer[3] examined 125 freshly exposed brains and showed that only in 5 of the cases examined did the optic chiasma lie in intimate relationship with the chiasmatic sulcus. "In 96 per cent. the optic chiasma lay wholly or partly over the diaphragma sellae and the underlying hypophysis; and in 79 per cent. of these instances the anterior, and often the greater part of the chiasma, had the diaphragma-hypophyseal relation, the dorsal and the lesser part projecting variously over and behind

the dorsum sellae; in 12 per cent. the entire chiasma lay over the diaphragma and the subjacent hypophysis, and in 5 per cent. the dorsal part of the chiasma rested over the diaphragma, the anterior part resting upon the chiasmatic sulcus; in 4 per cent. of the bodies the entire optic chiasma was behind the diaphragma sellae, lying on the dorsum sellae and projecting behind it."

Fisher says the "optic chiasma does not lie in the very shallow groove on the sphenoid bone." Traquair states: "thus the chiasma lies well behind and above the usually described position, its posterior edge projects behind the level of the dorsum sellae to an average of 1.58 mm." (Zander[4]).

Wallis[5] examined 11 subjects and in only one did the chiasma lie in the usually described position. He found it usually lay over the diaphragma and partly on the dorsum sellae; he states that whilst the chiasma does occasionally lie in the sulcus chiasmatis it is nearly always completely posterior to this groove.

The dimensions of the optic chiasma vary in different subjects, the width is generally given as about 12 mm., the antero-posterior diameter, according to Zander is 8 mm., while the depth is usually given as 4 mm.

It is evident that the optic chiasma can be affected by any enlargement of the pituitary gland which is sufficiently great to press on the chiasma and so interfere with its function.

The diaphragma sellae and the basal surface of the optic chiasma may actually be in contact with each other, or may be separated by an interval of as much as 10 mm. Traquair gives the measurement of the interval as 4 mm. Owing to the fact that the back of the chiasma is on a slightly higher level this interval increases from before backwards.

In the centre of the diaphragma there is an opening through which passes the posterior part of the infundibulum. The diaphragma is, in a large proportion of cases, a dense strong membrane forming a complete roof over the hypophysis, except for a small foramen. This opening varies greatly in size, in some cases it may be very small, while in others it may be so large that "the diaphragma itself is reduced to a mere rim" (Traquair). "The greater portion of the diaphragma was in some instances found to be more or less fenestrated, and of frail build" (Schaeffer). Fisher says: "the diaphragma sellae is a very variable membrane." Thus a greater compression of the chiasma would take place in cases of hypertrophy of the pituitary gland associated with a poorly-developed diaphragma sellae, than would occur with a well-developed diaphragma.

The infundibulum "passes over the dorsum sellae in a forward and downward direction; immediately beyond its commencement it is in contact with the centre of the lower and posterior surface

of the chiasma"; thus it is shown that "it is the infundibulum, and not the hypophysis, which is in immediate contact with the chiasma, and it can also be shown that a thickened and congested infundibulum, or an infundibular tumour pressed upwards by a subjacent hypophyseal enlargement would impinge directly upon the mid-line of the under-surface of the chiasma, and so might exert a longitudinal pressure at a comparatively early stage" (Traquair).

The pituitary body varies considerably both in weight and dimensions, even under normal conditions (Rasmussen[6]). The average dimensions are 9 mm. antero-posteriorly, 6 mm. vertically, and 13 mm. transversely. The weight in males is 0.5 grm. and a little more in females, tall individuals have proportionally larger glands (Rasmussen). As regards age the gland is found to increase up to 45 years, after which it gradually decreases (Sharpey-Schafer[7]).

"The pituitary is divided into two lobes by a cleft, a larger anterior and a smaller posterior; the anterior lobe is glandular and very vascular, while the posterior lobe is made up of neuroglial fibres with glial cells scattered amongst them; there are no true nerve cells and few vessels" (Sharpey-Schafer).

That the pituitary gland enlarges during pregnancy is a fact that is now generally recognized. Swale-Vincent[8] states that "in pregnancy the pituitary may become hypertrophied to two or three times its normal size. The increase consists entirely in the glandular portions, *i.e.*, the anterior lobe. The pituitary during pregnancy resembles an epithelial tumour. The increase in the amount of secretion is seen by the fact that one can squeeze a milky juice out of the gland. This hypertrophy persists to a certain degree, even after pregnancy, so that the size of the gland in a multipara may be three times as great as that of the normal gland." Sharpey-Schafer also states that the gland becomes partly enlarged during pregnancy, and also that the gland is distinctly larger in females who have borne children than in nulliparae. Bandler[9] says that "the gland never goes back to its former ante-pregnant state." Various other authorities, including Comte[10], Launois[11], Mayer[12], Centili[13], Fisher[14], agree that the pituitary enlarges during pregnancy.

Sharpey-Schafer states that "the cells of the pars anterior are of two kinds: (*a*) clear and non-stainable (chromaphobe, often termed chief cells); (*b*) granular and stainable (chromaphil). These latter chromaphil cells are divisible into (1) those the granules of which stain with acid dyes (oxyphil, also termed eosinophil); and (2) those the granules of which stain with basic stains (basophil). Oxyphil cells are normally by far the more numerous. During pregnancy large granular or fibrillated oxyphil cells are observed

forming masses within the pars anterior which is always enlarged. [By some authorities these are described as enlarged chromaphobe cells which have acquired oxyphil characters (see Comte, *Ziegler's Beiträge* 23, 1898, and Launois et Mulon, *Comp. rend. de l'Assoc. des Anatomistes*, Liège, 1903).] They have been called "pregnancy cells." Sharpey-Schafer thinks they are modifications of the ordinary oxyphil cells. He states that "after parturition they become smaller and also lose their specific appearance, but oxyphil cells always remain in larger numbers." Beckerhaus[15] states that the pituitary enlarges during pregnancy and that the increase is in the number of "Hauptzellen," and at the end of pregnancy they number 80 per cent. of the total cells. These have also been called the "pregnancy cells" (Schwangerschaftszellen); it would be seen that Beckerhaus leans towards the opinion that these pregnancy cells are enlarged chromaphobe cells which have acquired oxyphil characters. Erdheim and Stumme[16] examined microscopically 25 cases and found that the eosinophil or oxyphil cells are always the predominating cells, next numerous are the basophil; the "Hauptzellen," or chromaphobes, are scarce in nulliparae and men.

A further 150 cases were then examined by Erdheim and Stumme and as many cases as possible were collected of pituitary glands, where death had occurred during delivery or a few days after, so as to obtain a gland before the "involution stage" had set in. The gland was found to be considerably enlarged macroscopically, and projecting out of the sella Turcica, but it was only the anterior lobe that was found to take part in this enlargement. Histologically, the chromaphobes, or "Hauptzellen" were considerably increased, they were also enlarged and became the "Schwangerschaftszellen," or pregnancy cells. A few weeks after the birth of the child the eosinophils again predominated. Involution took place rapidly, but histologically the pituitary remains altered for many years after one pregnancy. It has already been shown that the pituitary enlarges during pregnancy and that it reaches a maximum growth just before the termination of the pregnancy. The increase in size is generally taken as anything from two to three times its volume, and the weight of the pituitary in various subjects is shown below; the weights are those given by Erdheim and Stumme and the number of cases examined was 150.

Average weight of hypophysis in nulliparae=61.8; max. 75 cg.
Average weight of hypophysis in primiparae=84.7; max. 110 cg.
Average weight of hypophysis in multiparae=106; max. 165 cg.

Thus it has been clearly shown that the pituitary in pregnancy increases both in volume and weight. That the optic chiasma and

the pituitary have a very close relationship is a fact that has been clearly stated earlier in this paper, and from our clinical experience we know that tumours of the pituitary produce defects in the fields of vision. This fact suggested to various observers that in pregnancy the fields of vision might be affected by pressure on the chiasma by the enlarged pituitary gland.

It is evident that the amount of bitemporal contraction depends on:

(1) The amount of hypertrophy of the pituitary gland.

(2) The amount of compression of the chiasma.

(3) Anatomical peculiarities of the chiasma, sella Turcica, and diaphragma sellae.

Observers showed a great deal of discrepancy in their results. The results of a few of these observers are as follows: Finlay[17] of Cuba examined 31 cases of which only 9 could be considered approximately normal, the remainder showing changes in the nature of a bitemporal contraction; of these 8 were slight, 9 moderate, 5 pronounced. The methods of his examination are not given in this thesis. Dr. Maud Carvill[18] of Boston, Mass. examined the fields of 67 gravid women, the progress of whose pregnancies was otherwise normal, *i.e.*, there were no complications, their blood pressures, urines, and general health were considered normal. Their fundi were normal, and their vision was of normal acuity. Dr. Carvill says: "the definiteness of the delineation of the fields has impressed us. In many cases the variation of a degree in the position of the test objects was a definite question of seeing it or not seeing it." The fields were taken by daylight with a perimeter with a radius of 28 cm., using a 5 mm. opaque white test object. Dr. Carvill's results were as follows: 61 cases were examined during the last month of pregnancy, only 7, or 11 per cent. were considered normal; the remaining 54, or 89 per cent. showed bitemporal contraction of a greater or less extent; 16 cases, or 28 per cent. showed a marked contraction (20° or more); 12 cases, or 20 per cent. showed moderate contraction (10° to 20°); 26 cases, or 42 per cent. showed slight contraction. Dr. Carvill says that the work of Erdheim and Stumme proves the question of functional hypertrophy beyond the stage of conjecture. After parturition there occurs a subsidence, involution being complete at the end of lactation; with each succeeding pregnancy a further augmentation takes place. The women examined by Dr. Carvill were all of good intelligence and 5° was regarded as the minimum for a definite contraction. Dr. Alexander Fewell[19] states "13 gravid women were selected in the order of their admission to the maternity department of the

School of Medicine of the University of Pennsylvania, all of them were normal in all other respects and none of them exhibited any abnormality or disease of the fundus oculi. All were approaching the termination of their pregnancy, *i.e.*, in the ninth month. Six of the women were primiparae, one in her second pregnancy, one in her fourth, two in their sixth, one in her ninth, and one in her tenth. (Dr. Fewell mentions 13 cases, but only accounts for 12 of them.) All the fields were taken with white test objects, 5 mm. and 3 mm. (colours yielded no additional information) with daylight exposure. Where contraction of the fields was found with these tests they were also and similarly contracted when investigated with large white test objects, *i.e.*, 15 mm. Following for comparison the "Lancaster-Carvill rule" fields contracted for 5° or less were considered to be normal. Dr. Fewell found that in only two cases were the fields normal in extent, and in one so slightly altered (only a slight contraction slope in the upper outer quadrant) that the fields were practically normal. (Two of the women were in their first pregnancy, and one in her ninth.) In 9 cases there was definite contraction on the temporal side of the field, *i.e.*, from 15° to 40°; three of these cases showed a slight nasal contraction, but in no instance (5 mm. test) more than 15°; in one case there was a temporal slope in one field and an upper temporal indentation in another. In seven of the charts the reactions to the 5 mm. and 3 mm. test objects were identical, or practically so; in the other five the fields charted with the 3 mm. test objects were smaller than those with the 5 mm. test objects, but practically identical in shape, and in only one case was there a decided difference. In no instance was it possible to find a complete bitemporal hemianopia, and in none was there the slightest sign of a scotoma in the caeco-central, or para-central areas; also there were no alterations in the size of the blind spot, and no changes in the area above it. The restoration of the visual field boundaries, in all cases tested to determine this point, was evident after the termination of pregnancy.

W. Lohlein[20] says that bitemporal hemianopia is very constant and can be demonstrated in 78 per cent. of all pregnant women towards the end of pregnancy. At first Lohlein met with disappointing results as he examined in the eighth and ninth months, later the fields were examined two to three days ante-partum; in two cases he examined on the day of labour. He says that, if pregnant women are examined in the last two months, in the majority this phenomenon is quite obvious, starting four weeks ante-partum and reaching the maximum at the time of labour. The contraction for colours (red and green) is always observed first and disappears about ten days after birth, but remains a little longer in multiparae. Lohlein says that the increase in volume is

chiefly from above downwards, *i.e.*, the pressure is on the posterior angle of the optic chiasma. This coincides with his field of vision findings. Lohlein actually shows a graph giving the relation of this phenomenon to the days preceding birth, and just after. It is constructed from several observations and represents an average. In this graph Lohlein shows that the amount of contraction of the field of vision is greatest 36 hours before the birth of the child, and that so rapid is the subsidence of the pituitary gland that at the end of twelve hours after birth the amount of pressure on the chiasma is so reduced that contraction of the field is the same as that of seven days after parturition. J. Igersheimer[21] examined 12 cases in the last months of pregnancy and came to the conclusion that a "very constant bitemporal hemianopia occurs." Bellinzona and Tridonani[22], also Forti[23] recorded changes in the visual fields of a similar nature which they attributed to dynamic or vaso-motor disturbances similar to those occurring in hysteria. This was quoted by Finlay at the proceedings of the International Congress of Ophthalmology, Washington. Erdheim and Stumme quote one case of bitemporal hemianopia (Reuss. Sehnervenleiden in Folge von Graviditaet: *Wien. Klin. Wochenschr.*, p. 1116, 1908), but they think that this must be exceptional. Traquair[24] thinks "the so-called bitemporal contraction in pregnancy is also functional." Fisher[25] quotes a case as follows: "A woman who had suffered from double papillitis and symptoms of vomiting which may probably have been of cerebral origin associated with pregnancy, had severe headaches coming on a few weeks after the onset of pregnancy, which were accompanied by paralysis of the left external rectus muscle, the pain disappearing after confinement. A few weeks after again becoming pregnant the headaches returned as before; this pregnancy terminated at three months spontaneously. The sixth nerve paralysis persisted on the left side and she developed a partial, but quite definite, hemianopia indicative of pressure on the left optic tract. The hypophysis is known to be larger in a woman who has borne children than in a nullipara. The explanation in this case seems to me to be that the enlargement of the pituitary body associated with pregnancy exceeded the limits of the normal, and sufficiently so to cause pathological increase of intra-cranial pressure in two successive pregnancies; the enlargement extended particularly to the left side of the sella Turcica and thus involved the left sixth nerve in the floor of the cavernous sinus groove, and to some extent the left optic tract." The X-ray picture of this patient's skull showed a rather deeper sella Turcica than normal, and the anterior and posterior clinoid processes were rather closer together. Fisher says that "in such a fossa any unusual and rapid swelling of the pituitary body would probably find its path of least resistance to be

in the lateral directions, and in this case the swelling expanded particularly to the left side." E. Holn[36], who confirmed Finlay and Carvill's findings, after seeing Lohlein's article, made independent investigations; he thought that the enlargement of the pituitary was for the purpose of preparing for uterine contraction during labour, and he tried to find a relationship between the severity of the pains and the size of the pituitary gland, as shown by visual disturbance. He got no results. Forty-five fields of vision were tested, 36 of which were in the last month, both white and coloured objects were used, especially blue, red, green, and yellow; only one case showed anything at all, in this the field examined with the 5 mm. white test object was constricted bitemporally and in this case labour was prolonged, *i.e.*, the uterine contractions were weak and pituitrine had to be given to terminate the confinement. Even here Holn is doubtful of the result being functional and due to fatigue. All his other 44 cases were normal. Dr. Leni Schoninger[27] examined 24 cases, several of them 7, 5, and 2 days before parturition. He did not obtain a single positive result, and thought that fatigue played a rôle, also suggestion. One case which showed apparently a result lay down and rested for half an hour; the patient, after resting, gave a normal field of vision. Beckerhaus examined 150 cases among which there were a few abnormal findings, most of which Beckerhaus was able to explain by functional conditions, or they were within physiological limitations; his actual findings were that one case had slight limitations of the fields of vision and sense of light in both eyes. His second case showed slight unilateral temporal limitation for colours only, not for white.

During the past twelve months I have examined the fields of vision, etc., of 70 pregnant women at the ante-natal clinic of the Leicester Maternity Hospital. All the patients who were seen by me were calculated to be in the last month of their pregnancy. The two extreme cases were, one patient was examined 43 days before her confinement, whilst another was examined one day prior to her confinement, the average of the total number of days previous to parturition was 15.9 days. The majority of the women belonged to the labouring class and a large proportion of them had been themselves working during part of their pregnancy. The cases were in no way specially picked; they were just taken in the order in which they presented themselves at the clinic. A number of those attending the clinic, refused to be examined, while others refused in the course of their examination to proceed with it. The patients were of varying ages, the oldest being aged 43 years, while there were two patients aged 17 years. The number of the

pregnancies varied, the greatest being that of one patient who was pregnant for the seventh time. Of the seventy patients, 43 were pregnant for the first time, 15 for the second, 5 for the third, 4 for the fourth, 2 for the fifth, and one for the seventh. A few patients were rejected for various causes, such as corneal ulceration, convergent strabismus, divergent strabismus, iridodonesis following an injury to the eye many years previously. One patient was found to be colour blind.

The urines, etc., were examined, and in those cases in which albumen was found the blood pressure was taken and is shown in the appendix. The fundi of all the patients were examined and all found to be normal except in the case of Mrs. D.D. No. 36, who had developmental defect of the right disc. The visual acuity of all the patients was taken and in cases where the vision was not 6/6 the pupils were dilated with homatropine and cocaine, a retinoscopy was done, and the cause of the diminished visual acuity was ascertained.

Only three patients complained of any alteration in vision during pregnancy, one had a large error of muscle balance, while the other two had large amounts of hypermetropic astigmatism; one of these latter patients actually said that during the past two months she thought she "was going blind." This patient's vision was: right eye 6/36, left eye 6/12. I found she had 4.5 dioptres of hypermetropic astigmatism in the right eye, and 1.0. dioptre of hypermetropia combined with 1.5 dioptres of hypermetropic astigmatism in the left eye. She had never previously worn glasses; her vision when wearing her correction was: right eye 6/12, left eye 6/6; this patient's age was 25 years, and this was her first pregnancy. I expect that she had always managed to do her work until the strain of pregnancy upset her accommodation.

None of the 70 patients complained of "seeing through a blue mist"; even when asked a direct question none of the replies was in the affirmative. "Patients with rapidly growing pituitary growths have described to me the symptom of "seeing through a blue mist" (Fisher), and such experiences are recorded by other observers.

The visual fields were taken with a Rayner perimeter of 32 cm. radius, and in daylight, except where otherwise stated, and with varying sizes of test objects. In all cases the test objects were moved from without in.

I divided my cases into three groups:

(*a*) This group was examined with a 10 mm. object. The cases were examined with white and three colours, *i.e.*, blue, red, and green.

(*b*) The fields of vision in this group were examined with a 5 mm. test object, and were also examined for a colour scotoma.

It has been suggested by E. Fuchs, according to Traquair, that scotomata or scotomatous types of fields might be due to toxins secreted by a neoplastic hypophysis. Parsons[28] quotes Nettleship as stating that in enlargement of the pituitary body "the earliest visual symptom is unilateral colour scotoma." Bishop Harman[29] states: "the failure of colour sensibility is an early sign of defect of the optic nerve."

(*c*) The fields of vision in this group were examined with a 2 mm. test object; and this group was also examined for a central scotoma or a scotoma in the temporal field.

In Group (*a*) the fields of 20 patients were examined with a 10 mm. object for contraction of white, blue, red, and green fields. Sixteen of these patients were pregnant for the first time, the other four were second pregnancies. All the patients were examined in daylight, except No. 14, Mrs. M.S., who was examined in artificial light. Twenty patients were examined, *i.e.*, 160 fields of vision; only two patients out of this number showed anything abnormal in the nature of a temporal contraction.

(1) Mrs. W.B. No. 9, aged 20 years, first pregnancy. This patient, before the examination commenced, volunteered the statement that "the left eye had always been defective," yet her vision right and left was 6/6. I was unable to find any cause in the fundi for either her statement or the contraction, the only abnormality found on examination being a large error in her muscle balance; the amount of contraction was 10° temporally for white only in the left field. The contraction extended from the angle 105° to the angle 135°. Her remaining seven fields were normal.

(2) Mrs. L.B. No. 18. The whole of this patient's fields were normal, except the right field for blue. The amount of contraction was only 10° and extended from the angle 90° to the angle 150°. This patient was extremely nervous and I feel sure that if an opportunity had presented itself of doing this field again it would have shown the normal limitation.

Since only two fields out of 160 fields of vision showed any change at all, and the amount of that very slight indeed, with a probable reason for each contraction, and also since the amount of that contraction was quite within the bounds of the physiological, I think it may be assumed *that the fields of these 20 patients were all normal.*

Group (*b*) consisted of 30 patients whose fields of vision for white were examined with a 5 mm. test object, all of whom were also examined for a colour scotoma. *These 60 fields were all normal, no contraction being present.* No scotomata were found, but one patient, Mrs. D.D. No. 36, was rather uncertain of the colours with the left eye. I was unable, however, to mark out any

definite scotomata. In the right eye no scotomata were found. One patient in this group, Mrs. E.G., was colour blind.

One patient, Mrs. E.S. No. 21, was examined in artificial light, all the others were examined in daylight. Thus we see all the patients in group (*b*) *gave negative results.*

Group (*c*) was composed of 20 patients whose fields I examined with a 2 mm. white test object, making in all 40 fields of vision. Of these, 13 *patients gave absolutely normal fields;* seven were examined in artificial light, the remaining six with daylight. Of the remaining seven patients who showed contraction *four had one field only contracted*:

(1) Mrs. F.A. No. 51, right field normal, left field temporal contraction, amount 7° from angle 80° to angle 145°.

(2) Mrs. K.A. No. 52, right field normal, left field temporal contraction, amount 15° from angle 105° to angle 135°.

(3) Mrs. H.S. No. 53, right field normal, left field temporal contraction, amount 7° from angle 65° to angle 145°.

All these three patients were examined in daylight.

(4) Mrs. M.F. No. 66, right field was examined first and was normal; while the left field, which showed 10° of temporal contraction, was being examined, patient complained of being fatigued and was obviously tired. In addition she had a small amount of albuminuria and her blood pressure was 115/75.

Of the three remaining patients the first two were examined in artificial light.

(5) Mrs. H.O. No. 59. This patient showed 10° of contraction of the lower temporal field of the right eye. She also showed contration of the same amount of her nasal field. Her left field showed concentric contraction, varying in amount from 15° to 5°. This patient had advanced tuberculosis of the lungs. Her general mentality was poor. Owing to her delicate health in childhood this patient had never been to school and was illiterate.

(6) Mrs. M.S. No. 62, showed 5° of temporal contraction in both fields. This patient's right vision was 6/36 and left vision was 6/12. She had a large error of refraction uncorrected. Right eye: 4.50 dioptres of hypermetropic astigmatism, and left eye: 1.50 dioptres of hypermetropic astigmatism combined with 1 dioptre of hypermetropia. Her vision with correction was R.E. 6/12 and L.E. 6/6. The fields were examined while the patient was not wearing her correction.

(7) The third patient showing bitemporal contraction was Mrs. F.D. No. 67. She was examined in artificial light and showed right eye 5° of contraction from angle 120° to angle 140°, and left eye 5° of contraction from angle 90° to angle 140°; the amount

of this contraction was very small and patient had some albuminuria; her blood pressure was 135/80.

Taking into account the smallness of the test object thirteen out of twenty patients were absolutely normal, and only three out of twenty showed an amount of bitemporal contraction which was within the limits of physiological contraction, also two of these patients showed a perfectly good reason for this contraction, *i.e.*, Mrs. H.O. No. 59, general poor mentality and development, and Mrs. M.S. No. 62, large uncorrected error of astigmatism, while the third patient, Mrs. F.D. No. 67 had albuminuria. I have thus shown that in the seventy patients examined only three showed bitemporal contraction, and the amount of this was very small, the size of the object being 2 mm., and these three patients all had some other disturbance of their condition apart from pregnancy.

I think we can assume from these figures, and from those given by Beckerhaus who examined 150 cases, that bitemporal contraction of the fields of vision in pregnancy does not occur.

It is perhaps surprising to note that the bitemporal hemianopia has been stated to be symmetrical. This could only be accounted for by an absolutely central and almost knife-edge protrusion of the enlarged gland. The possibility of such an occurrence appears to me to be very difficult to believe.

In view of the rarity of observers in Europe finding contraction of the fields as compared with the frequency of positive results in America, it might be well to ascertain the following points:

(1) If some racial peculiarity of skull formation or pituitary development or; (2) if retinal fatigue; or (3) even suggestion could account for this diversity of results by skilled observers.

In conclusion I wish to thank Mr. Lewis Lilley by whose kindness I was permitted to examine these patients. I also wish to thank Mr. J. A. Keen for his valuable suggestions.

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UNILATERAL CHRONIC ANTERIOR UVEITIS IN CHILDREN. A CLINICAL NOTE

BY

ERNEST THOMSON

STIRLING

FROM the standpoint of clinical observation and research the post of oculist to a large education authority has certain advantages and certain drawbacks. The principal advantage is that one sees a large number of young people who may show the beginnings of disease which otherwise might go unnoticed. Parents will bring a child when they have been definitely notified by the School Inspection Staff that the eyesight of the child is defective, although of their own initiative they would not seek advice: such failure to seek advice is either because they are unaware of the defect or do not think it important. The principal drawbacks are two in number. The first is that while one may see the beginnings of disease there is usually no opportunity to see the end, since the child may and probably will be lost sight of on

leaving school. The second drawback is that, at any rate in the case of a county authority, laboratory assistance may not readily be available. In my own case, it happens that as an oculist to the Lanarkshire Education Authority the children may live at any distance between ten and forty or so miles from a first-class clinical laboratory.

It is with great diffidence that the following notes are published, since, though the facts are interesting so far as they go, they do not go very far. For myself, they are unexplained. Worse still, they may be commonplace. Thinking that the latter might be the case I brought the observed facts before the notice of the Scottish Ophthalmological Club a year or two ago and was rather surprised to find that, while many had seen uveitis of one kind or another in children, no one seemed to have specially observed the peculiarity of unilaterality which is the most outstanding feature of the cases here to be described. Since then further cases having come into the list, which now contains ten, I think it my duty to put them forward in order that, if it should turn out that the type is unfamiliar, investigations may be carried out by those who are in a position really to investigate the aetiology, without a knowledge of which one simply works in the dark. Some of my former colleagues at the Glasgow Eye Infirmary have seen some of the children, notably Dr. Leslie Buchanan and the late Dr. Hislop Manson. Buchanan originally applied the name "chronic anterior choroiditis," but I think "uveitis" leaves the diagnosis more general. Neither of these was able to offer a firm basis of aetiology. Manson, indeed, had undertaken to investigate the cases biologically as they occurred, but, owing to his untimely death, nothing much ever came of it. That he did obtain negative reactions in several I know, but in only one case have I any statement in writing, and in that the syphilis and tubercle reactions were negative. In a letter dated November 29, 1924, he says: "I have never found any determining cause in any of these cases of anterior choroiditis nor have I ever seen any in my clinic" (*i.e.*, other than those I sent him.—E.T.). Again, regarding Mary McD., he wrote on December 4, 1924: "She was in the Infirmary for a week. The Wassermann reaction was negative, von Pirquet was negative, and the general condition showed nothing in particular." She was seen by Dr. Gavin Young who reported "tonsils and adenoids." Manson in this same letter, which was written from his house, stated that this child had keratitis punctata and vitreous opacities in the other eye also, but I am almost certain that this is a fault of memory for I never could find any such signs in it. From my own observation I can say that none of the cases presented any obvious clinical signs of syphilis or tubercle, so that the evidence, *so far as it goes,* is against these as aetiological

factors. But it does not go far enough. Concerning aetiology, or rather of the want of it, that is about all I have to tell. The rest refers to clinical signs and symptoms.

The initial characteristics of all ten cases are: (1) Signs of uveal tract disturbance, but without either visible fundus changes or definite iritis. All the pupils dilated readily with atropine though there is evidence in some that the iris was not entirely unaffected. Nor can one be quite definite about fundus changes where there are opacities in the media. All that can be said is that practically there were none when the children were first seen: and, indeed, the only case in which fundus changes were afterwards seen was that of William G., who developed detachment of the retina and possibly of the choroid. (2) Unilaterality of the trouble, the other eye being either completely normal or presenting changes having no obvious connection with those in the affected eye. The case of Mary McD. is, it is true, a possible exception but for the reason stated above I do not think so. (3) Great chronicity. Only one appeared to be cured, at any rate in so far as visual acuity was 6/6 when seen two years later; but there were still some vitreous opacities—this case was Mary McL. On the other hand, Annie Y. seemed to be cured and obtained vision=6/6, but had a slight relapse after four years from the date when first seen.

The above-mentioned signs of uveal tract disturbance consisted in all the cases in vitreous opacities, sometimes fine and dust-like, sometimes coarser and floating, while sometimes there were both types. In four cases there were posterior corneal deposits. In one of these, the one that appeared to be cured fairly definitely, they disappeared. In one they were only noted for the first time after the child had been under observation for a year, while in the remaining two cases they were still present respectively four and three years afterwards. The progress of one case was very exceptional, namely William G. This boy was first seen when he was thirteen on June 2, 1920. At that time there was nothing wrong beyond an error of refraction, the visual acuity being 5/6 in either eye with correction. On April 30, 1923, he was put forward to me because of serious lowering of the vision of the right eye to 6/60. He was then classed as a typical case of unilateral chronic anterior choroiditis, the acuity of the left eye being 6/6 at which it remained until last seen in May, 1926. He was referred to Dr. Manson for investigation. I have no note from Manson at this time. Between 1923 and 1924 I discovered that the retina was detached in the affected eye, presenting a festoon-like appearance upwards and inwards. I again sent the boy to Manson when it turned out that he (Manson) had already observed the detachment but had failed to communicate with me. On June 12, 1924, he wrote to the School Medical Officer as follows: "I am familiar

with the condition of this boy's right eye as noted in Dr. Thomson's letter to you. I had him under my care in the Glasgow Eye Infirmary searching for the aetiology of this separation of the retina and could fine none. I have also a note of the vision of his remaining eye and find that there has been no deterioration in it." Again on November 29, 1924, he wrote to me: "The detachment in William G. is very interesting. It started well forward and up and in. It was very difficult to see at first. Now it is almost complete." Finally, I saw the boy on May 20, 1926, when I noted that the lens was becoming cataractous and that it was difficult to determine the conditions behind it. The retina was apparently almost completely detached and the detachment appeared to me to be red in colour. The acuity of the fellow eye remained 6/6. It is right to say that the question of removing the affected eye was considered but this was not undertaken. Transillumination was reported by Dr. Manson to be negative. The boy has, of course, now left school, indeed had passed out of my care when last seen, and at the moment there is no information available. Should any further history be obtained it will be reported in this journal.

All the material facts so far as they are known about these cases are embodied in the accompanying tabular statement. The treatment ordered, though not always carried out by the parents, was on general principles; cod-liver oil, grey powder, syrup of iodide of iron being the principal standbys. I cannot but emphasize that where these cases have been followed over a period of years an actual cure can hardly be said to have occurred; so that one is inclined to suspect that if they could be followed out to the end that end might be, as in the case of William G., detachment of the retina or some form of disorganization of the affected eye. Indeed, at one of the meetings of the Ophthalmological Club previously referred to, Traquair of Edinburgh had some views which tended in this direction. We should endeavour to determine whether any definite form of adult eye disease corresponds with these juvenile commencements, the end results of which can hardly —in existing circumstances—be seen by the school oculist, who, on the other hand, is much the most likely person to see the early stages. It is very important that, if similar cases come to the notice of the ophthalmic surgeon who is in a position to have them investigated, such investigation should be fully carried out if at all possible.

Obviously, if one definite cause were found, which is perhaps unlikely, we should be in a position to carry out a specific line of treatment which might avert the misfortune of such chronic, and indeed hopeless, deterioration as occurred in the case of William G., or, not to be too pessimistic, such chronic weakness of the affected eye as appeared to be the lot of Annie Y.

UNILATERAL CHRONIC ANTERIOR UVEITIS IN CHILDREN. TABULAR STATEMENT.

Name	Ref. No.	Age	Affected Eye					Unaffected eye	Date first seen and V.A.	Notes, Progress and Remarks
			R. or L.	Cornea	Iris	Lens	Vitreous and Fundus			
Andrew W. ...	Carluke 205	9	R	—	—	? Postr. capsular opacity	Numerous coarse and fine opacities	No visible changes (See Notes)	18/5/21 V.R. 5/9ll V.L. 5/9ll	Boy dates defective V. to looking at eclipse of sun in summer of 1921; both eyes unprotected. Best V. with correction is 5/9 L.E. 11/8/21. Condition I.S.Q. No further history.
William G. ...	Biggar	13	R	—	—	—	Fine vitreous haze without visible fundus change	Clear	2/6/20 V.R. 5/6 V.L. 5/6 with correction	When first examined for refraction on 2/6/20 there was no sign of trouble. On 30/4/23 was examined on account of much deteriorated V.R. which was found due to vitreous opacities. Referred to Dr. Manson at G.E.I. About 1923-4 developed retinal detachment. Dr. Manson's report says "Detachment started well forward and up and in; very difficult to see at first: now (29/1/24) it is almost complete." Also on 12/6/24 Dr. M. reports that he has endeavoured to get at the aetiology but has failed to find a cause. The V. of L.E. remained good when seen 25/5/24. 20/5/26 lens becoming irregularly cataractous and fundus difficult to see. Detachment nearly all round through which colour of choroid seen. V.L=6/6.

Name	Ref. No.	Age	Affected Eye					Unaffected eye	Date first seen and V.A.	Notes, Progress and Remarks
			R. or L.	Cornea	Iris	Lens	Vitreous and Fundus			
Mary McD....	Airdrie 125c	9	L	K.P.	—	—	Extremely fine vitreous opacity Fundus indistinct	No visible changes (See Notes)	20/6/24 V.R.6/24ll V.L. 6/24	Refraction (worked later) showed 2 D. myopic astm., and correction brought R.E. to 6/6. Has some decayed teeth. Dr. Manson reported 4/12/24 Wassermann and von Pirquet both neg. "Tonsils and adenoids" reported by Dr. G. Young. 8/10/25 still K.P. and vitreous opacity L.E. No opacity seen in R. media. 1/2/26 L. iris noted to be lighter in colour than R. iris. Mother has noticed this. 15/2/26, under atropine, possibly slight pigment disturbance in fundus of R.E. Specially noted no K.P., but condition of vitreous not stated. In L.E. still K.P. scattered over cornea, not in usual triangle. Vitreous opacity much less. Fundus well seen. Nothing noted. 11/10/26, almost no K.P. in L.E. Ring of opacity on lens capsule just at limit of dilated pupil. Some fine anterior vitreous opacities. 26/5/27, V.R. 6/9, V.L. 6/9 with glasses. NOTE—Dr. Manson reported K.P. and vitreous opacities in R.E., but this is possibly an oversight. I could find none.

Name	Ref. No.	Age	Affected Eye					Unaffected eye	Date first seen and V.A.	Notes, Progress and Remarks
			R. or L.	Cornea	Iris	Lens	Vitreous and Fundus			
Jean McK. ...	Coatbridge I. 54	11	R	—	—	Opacity postr. lens capsule	Much vitreous opacity. Nothing seen in fundus	Recent corneal opacity. Otherwise media clear	9/3/15 V.R. 5/36 V.L. 5/24	20/3/16, still vitreous and lens opacities in R.E. L.E. as before. Refraction worked. R.E. −1 sph. +2 cyl. 75° = 5/12. L.E. −1 sph. = 5/9. Case lost sight of (war years).
William M. ...	Larkhall 291	13	L	—	—	Fine peripheral opacities thought to be congenital	Large and small floating vitreous opacities. No fundus changes observed	Fine peripheral lens opacities. Media and fundus otherwise normal	15/2/21 V.R. 5/5 V.L. 5/911	3/5/21, about I.S.Q. Seen by Dr. L. Buchanan. K.P. specially looked for by both of us; none found. Case lost sight of.
Mary D. ...	Lanark 88A	7or8	L	—	—	—	Fine opacity in anterior part of vitreous Nothing observed in fundus	Clear	30/1/23 V.R. 6/24 V.L. 6/24	Refraction mixed astm.? Decayed teeth. 21/6/23, L.E. vitreous opacities marked. R.E. remains normal. Teeth not yet attended to. V.R. 6/18, V.L. 6/24. 30/11/26 out of my care. Reported to have V.R. 6/9, V.L. 6/18 presumably with correction about −3.5 cyl.
Annie Y. ...	Airdrie II. 246	9	R	K.P.	—	—	Fine floating vitreous opacity. No changes in fundus observed	Clear from 1920-1924	21/6/20 V.R. 3/60 V.L. 5/60	Refraction H. Astm. Corrected V.R. 6/24, V.L. 6/9. Seen frequently to 11/8/21 by self and L. Buchanan Always K.P. but lessening vitreous opacity. V.R. 6/6, V.L. 6/6. May, 1923, still K.P., vitreous opacity slight or absent, V.R. 6/6, V.L. 6/6. 22/11/23, as above. November, 1924, slight relapse, K.P. quite distinct, some floating v. opacity, but V.A. still 6/6. Note.—In four years of observation no constitutional cause emerged. Now left school.

Name	Ref. No.	Age	Affected Eye					Date first seen and V.A.	Notes, Progress and Remarks
			R. or L.	Cornea	Iris	Lens	Vitreous and Fundus		
Thomas E. ..	Motherwell 257A	9	R	—	—	—	Anterior vitreous opacity exact character not stated. At later date referred to a "floating mass"	Clear but convergent squint and amblyopia	6/2/19 V.R. 6/12 V.L. 1/36	Refraction H. Astm. Corrected V.A. of R. (affected eye) = 6/9ll L.E. amblyopic. Seen many times for about a year by self and L. Buchanan. Cause obscure. Condition of vitreous varies. In December, 1919, when last seen there was more vitreous opacity and V.R. 5/12 in spite of fairly continuous treatment with hyd. c. cret.
Mary McL. ..	Lanark 245	12	L	K.P.	—	—	Dust-like vitreous opacity. Fundus seems normal	Posterior polar cataract. Fundus not clearly seen. No vitreous opacity detected	15/5/19 V.R. 6/18 V.L.6/9ll	Refraction worked at later date H.A. Seen also by L. Buchanan. 11/9/19. V.R. 6/18, VL.. 6/12. 20/5/20 K.P. no longer visible. Still vitreous opacity but less marked. Fundus now better seen, seems normal. 20/9/20, 25/5/21, vitreous opacity less, V.L. 6/6. V.R. (eye with cataract) 6/36. No further history.
Sarah C. ...	Bellshill 351A	12	R	K.P. seen 30/11/25	—	Fine opacities on anterior capsule	Numerous anterior floating vitreous opacities. No fundus changes observed	Clear	26/1/25 V.R. <6/60 V.L. 6/36	Refraction worked approximately, H.; with temporary correction. V.R. 6/36, V.L. 6/9. 5/2/25, mother reports 9 children living and 6 dead. This child Sarah has not had serious illnesses, and presents no stigmata of syphilis. 30/11/25, K.P. seen today for first time. Later, passed out of my care; no notes obtainable.

RACE, SEX AND ENVIRONMENT IN THE DEVELOPMENT OF MYOPIA*

(Preliminary Communication)

BY

A. SOURASKY

LONDON

THE presence of a large Jewish population in the East End of London offers exceptional facilities for the study of racial differences in errors of refraction by making comparison between the Jewish and non-Jewish populations. There is also the fact that the Jewish boys in the East End do an exceptionally large amount of close work, which affords an opportunity of testing the effect of close work on the production of myopia by investigating whether an undue percentage of myopes is developed among the Jewish boys as they go through their school life.

It will not be out of place to say a few words about social conditions among Jews in the East End. As immigration into this country has practically ceased since 1914, the children attending the elementary schools are almost all born in this country, though in the vast majority of cases their parents are of Polish or Russian origin.

The children are brought up in very much the same way as the non-Jewish child population, except in the case of the boys, who in addition to attending the ordinary elementary day school, also attend classes for the study of Hebrew for two and a half to three hours every evening (except Friday and usually also Saturday when there is no attendance, and Sunday, when attendance is in the morning).

The conditions under which these studies are conducted are by no means ideal. The vast majority of the classes are held in rooms and buildings that ought never to be used as school rooms. In addition the lighting conditions are often exceedingly bad. (Much of this is being rectified owing to the activities of the fairly recently established Jewish Health Organization of Great Britain.)

Those acquainted with the Hebrew alphabet know how tiring its letters are on account of the alternate thick and thin strokes, and the little difference (such as a slightly longer thin stroke) that exists between one letter and another. Difficult as these conditions are they are made still more difficult by the fact that the books in use are almost all badly printed, poor type on poor paper; and as the schools are supported by voluntary contributions they

* This investigation was carried out under the auspices of the Jewish Health Organization of Great Britain.

experience the usual financial embarrassment associated with such institutions, so that in most schools only one book is provided for the use of two pupils. All this together with improper use or the total absence of desks, must throw a strain on the eyes, such as the non-Jewish boys can hardly experience.

In the East End, therefore, there exist conditions, which, if the theory that excessive close work is productive of myopia be true, should produce an abnormally high percentage of visual defectives among Jewish boys; and furthermore, a group of East-End boys from 6 years to 14 years should show a progressive increase in the number of defectives with each year of school life, greater than that (if any) among non-Jewish boys. For any comparison to be made it will, of course, be necessary to have corresponding data about the two groups of children.

The incidence of visual defect in the non-Jewish children has been established by many observers, but unfortunately most statistics on the subject are vitiated by some factor or other. Thus some observers give the vision with both eyes open simultaneously; others (including the London County Council authorities) test vision with such glasses as the child may have. From various sources it would appear that the defectives (vision less than 6/9) constitute about 20 per cent. of the non-Jewish child population.

However, in order to have strictly comparable figures Drs. F. G. Thomas and G. Chaikin of the London County Council have very kindly undertaken a special investigation among non-Jewish boys, conducted under conditions identical with those under which the inquiry among Jewish boys was carried out.

One thousand six hundred and forty-nine boys in the Hebrew Evening Classes (Talmud Torahs) were examined for visual acuity. Each eye was tested separately, and the child classified in the group corresponding to the eye with poorer vision.

On a similar basis 600 non-Jewish boys were examined at London County Council Schools in the East End.

TABLE I.

Showing the proportions of good and defective vision among Jewish and non-Jewish boys in the East End of London.

Subjects.	Total number.	Ages.	Vision of 6/9 and 6/6.	Vision of 6/12 and 6/18.	Vision less than 6/18.
Jewish boys ...	1,649	6-14	56.8%	22.1%	21.1%
Non-Jewish ...	600	8-14	78.3%	15.0%	6.7%

Table I shows that whereas among the Jewish boys only 56.8 per cent. succeeded in passing the test for good vision (6/9 or better) among the non-Jewish boys as many as 78.3 per cent. passed; that is 43.2 per cent. among Jewish and 21.7 per cent. among non-Jewish boys are defective. The incidence, therefore, of visual defect among Jewish boys is undoubtedly considerably greater than among non-Jewish boys; it is in fact double.

The figures on the whole are in agreement with those published in the Report for 1924 of the School Medical Officer for the London County Council. There the findings were that among "Leavers" the defectives (6/12 or worse) among Jewish boys constitute 43.2 per cent. and only 20.9 per cent. among non-Jewish.

The suggestion that excessive close work is a cause of defective vision is therefore strong. But when we come to analyze the figures according to age (Table II) we are struck by the fact that the heavy incidence of defect among the Jewish boys is apparent

TABLE II.

Analysis of visual acuity among Jewish boys in the East End according to the different age groups.

Age group.	6/6. 6/9.	6/12. 6/18.	6/24 and less.
6 and under 7 ... 48 cases	29 60.4%	13 27.1%	6 12.5%
7 and under 8 ... 138 cases	77 55.8%	42 30.4%	19 13.8%
8 and under 9 ... 162 cases	95 58.7%	47 29.0%	20 12.3%
9 and under 10 ... 270 cases	156 57.8%	64 23.7%	50 18.5%
10 and under 11 ... 298 cases	165 55.4%	59 19.8%	74 24.8%
11 and under 12 ... 325 cases	201 61.8%	54 16.6%	70 21.6%
12 and under 13 ... 319 cases	171 53.6%	68 21.3%	80 25.1%
13 and under 14 ... 89 cases	44 49.4%	17 19.1%	28 31.5%
TOTAL ... 1,649	938 56.8%	364 22.1%	347 21.1%

at the very beginning of school life, at the age of 6; and is not very markedly less then than towards the end of school life. If one ignores the groups at 6 years and 14 years (and they do not constitute very large numbers) the almost stationary percentage of defectives (about 43 per cent.) at the different age groups is really remarkable, and is not at all what one would expect, if the strenuous school life of the Jewish boys were productive of myopia. There is certainly but little evidence of any large decrease in the percentage with good vision among Jewish boys during school life.

It might be argued—and indeed some authorities do argue—that the percentage of children with good vision increases with advancing school age. This is almost certainly true of children up to the age of 8 years, as the cerebro-visual mechanism is not fully developed by then, but there is little evidence that the percentage with good vision increases after the age of 8. If among non-Jewish children the percentage of boys with good vision increases with school life, whilst among the Jewish it remains constant, then we are dealing with a relative increase of defect among the Jewish boys. The distribution of defectives according to age groups among non-Jewish boys is therefore of interest.

TABLE III.

Analysis of visual acuity among non-Jewish boys in the East End according to the different age groups.

Age group.	6/6. 6/9.	6/12. 6/18.	6/24 and less.
8 and under 9 100 cases	86	12	2
9 and under 10 100 cases	79	16	5
10 and under 11 100 cases	75	15	10
11 and under 12 100 cases	77	16	7
12 and under 13 100 cases	81	14	5
13 and under 14 100 cases	72	17	11

(This table shows the number of cases and the percentage simultaneously as 100 cases of each age group were taken.)

Whilst these figures are too small to draw any fine conclusions as regards the actual distribution of errors, it is felt that they justify the drawing of conclusions as regards the tendencies seen in childhood. Table III shows that, on the whole, among non-Jewish boys the percentage of good vision (about 77 per cent.) remains fairly stationary with progressing school life; the tendency is towards deterioration rather than towards amelioration. (The figures for the age group 8 are probably a "freak": the first 50 cases gave 12 defectives and the second 50 only 2.) The stationary percentage of cases with good vision among the Jewish boys therefore does not represent a relative deterioration, but shows a close parallel to the non-Jewish boys in the fluctuation it undergoes.

The evidence, therefore, is quite conclusive that Jewish boys have a much heavier incidence of visual defect than the non-Jewish, but also equally conclusive that it is present very early in school life and whatever deterioration takes places has its parallel among non-Jewish boys.

These figures suggest that the heavy incidence of visual defect among Jewish boys is racial rather than acquired and is not due to the strenuous school life to which the Jewish boys are subjected. But we require data about the actual refractive errors seen among Jewish children before any safe conclusion can be reached.

With this object in view the records of the London County Council Treatment Centres at the London Jewish Hospital and the Royal Eye Hospital were extracted to establish the relative incidence of the various refractive errors among the defectives in the Jewish and non-Jewish population, both these centres dealing mainly with the children that are found defective in the routine school examinations conducted by the London County Council.

It will be of interest to see whether Jewish defectives reveal a qualitative difference in the refractive errors in addition to the quantitative difference.

SECTION A

The type of refractive error seen among visually defective Jewish children and comparison with the Non-Jewish

From the records of the London Jewish Hospital 516 cases were extracted. These represent Jewish children only (who constitute about two-thirds of all the children attending the Eye Department of that Hospital). The ages vary from 5 to 14 inclusive, and the records date from April, 1923, to July, 1927.

A similar group of 892 cases of non-Jewish children comes from

the Royal Eye Hospital, the records dating from April, 1925, to July, 1927.

As there is no generally accepted method of analyzing the results of refraction, it is necessary to explain the purely arbitrary system adopted here.

The hypermetropes were divided into low and high according to whether they had less or more than 3D. of hypermetropia.

The myopes below 3 were regarded as low; between 3 and 6 as medium, and above that as high.

Astigmatism below 1.25 was ignored as such, but its value was added to the spherical error. Thus +2.5D. sph. c +1.OD. cyl. was regarded as simple hypermetropia of the high variety.

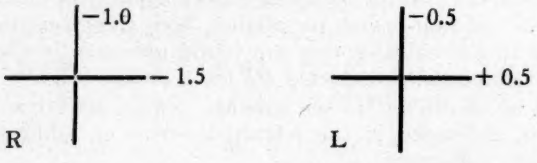
Similarly spherical errors below 1.25 were ignored in the classification of simple and compound astigmatism where astigmatism was the dominant error (astigmatism over 1D.).

Astigmatism between 1.25 and 3 was regarded as low; over 3 as high.

Only when opposite signs were present was the case considered as anisometropic; a marked difference in cases with the same signs, *e.g.*, (R.+6, L.+1), was classified according to the eye with the higher refractive error.

Mixed astigmatism calls for no explanation.

Finally, certain cases were not easily classified, and were grouped together as "Unclassified," *e.g.*:



In the Tables anisometropia, mixed astigmatism, and the unclassifiable cases are grouped as "Others." In some Tables (and it is indicated) this group was added (though the addition is clearly shown) to the myopes, on account of the myopic element they all contain.

An analysis of these 516 Jewish and 892 non-Jewish cases reveals that taking the broad classifications of hypermetropia (including hypermetropic astigmatism), myopia (including myopic astigmatism), and "Others" (which include mixed astigmatism, anisometropia and the cases difficult of classification), the difference in the distribution of refractive errors in these two racial groups is not very marked, apart from the rather higher percentage of myopes among the Jewish children.

TABLE IV.

Showing the distribution of refractive errors in the two groups of visually defective children:

Jewish Children.		*Non-Jewish.*
Total 516.		Total 892.
320=62%	Hypermetropia and Hypermetropic Astigmatism.	620=69.5%
130=25.2%	Myopia and Myopic Astigmatism.	180=20.2%
66=12.8%	"Others."	92=10.3%

A further subdivision of the above cases is of interest.

TABLE V.

Showing the comparative percentages of errors in the several subdivisions.

(*a*) *Subdivision of Hypermetropia.*

Jews.		*Non-Jewish.*
Out of 320 Hypermetropia and Hypermetropic Astigmatism.		Out of 620 Hypermetropia and Hypermetropic Astigmatism.
184=57.3%	Simple Hypermetropia	349 = 56.3%
136=42.7%	Simple and Compound Hypermetropic Astigmatism	271 = 43.7%
Out of 184 Simple Hypermetropia.		Out of 349 Simple Hypermetropia.
117=63.5%	Low Hypermetropia	170 = 48.7%
67=36.5%	High Hypermetropia	179 = 51.3%
Out of 136 Simple and Compound Hypermetropic Astigmatism.		Out of 271 Simple and Compound Hypermetropic Astigmatism.
85=62.5%	Simple and Compound Low Hypermetropic Astigmatism	190 = 70.1%
51=37.5%	Simple and Compound High Hypermetropic Astigmatism	79 = 29.9%

(*b*) *Subdivision of Myopia.*

Out of 130 Myopia and Myopic Astigmatism.		Out of 180 Myopia and Myopic Astigmatism.
99=76.1%	Simple Myopia	136 = 75.5%
31=23.9%	Simple and Compound Myopic Astigmatism	44 = 24.5%

Out of 99 Simple Myopia.		Out of 136 Simple Myopia.
70=70.7%	Low	102 = 75.0%
22=22.2%	Medium	28 = 20.6%
7= 7.1%	High	6 = 4.4%

(*c*) *Subdivision of "Others."*

Out of 66 cases.		Out of 92 cases.
17=25.7%	Anisometropia	23=25.0%
32=48.6%	Mixed Astigmatism	30=32.6%
17=25.7%	Unclassified	39=42.4%

We have seen from Table IV that myopia is rather more common among the Jewish children (25.2 per cent. against 20.2 per cent. of the total number of defectives). Table V reveals that the Jewish hypermetropes show many more with low hypermetropia than the non-Jewish (63.5 per cent. of the total hypermetropia as against 48.7 per cent.), but apart from the greater incidence of myopia (including mixed astigmatism), and of the lower degrees of hypermetropia there is but little difference in the two groups. The percentage of astigmatism, whether myopic or hypermetropic, as compared with the purely spherical errors (23.9 per cent. and 42.7 per cent. respectively among Jewish children, against 24.5 per cent. and 43.7 per cent. among the non-Jewish), is practically identical in each group. (Though there seems to be a greater incidence of high hypermetropic astigmatism among Jews.) These figures, therefore, lend no support to the suggestion that astigmatism is rare among Jews (K. Pearson), though there is some force in the belief that hypermetropic astigmatism is more common among them (Javal), when one remembers that though the percentage of astigmatism in the two groups of defectives is the same, we are dealing with a population that has about double the number of defectives. But then the same remark is true of myopia and also of hypermetropia.

The dominant suggestion of these Tables is that whilst hypermetropia—simple or compound—is the predominating refractive error in both Jewish and non-Jewish children, low hypermetropia is the common error among the Jewish hypermetropes, whilst high hypermetropia tends to be more common among the non-Jewish.

The excessive incidence of low hypermetropia among the Jewish children suggests an explanation of the rather high incidence of myopia among Jews.

The Tables, however, do not tell us whether the low hypermetropia seen among Jewish children is a congenital and a racial factor or the result of environmental conditions (such as excessive close work) which reduces an original high reserve of hypermetropia.

As the Tables deal with the rather long period of ten years it was thought advisable to subdivide them into two periods of five years each, from 5 to 9 (inclusive) and 10 to 14 (inclusive), and see how far low hypermetropia is still more common in the first period among Jews as compared with non-Jews at the time when the effect of school life cannot have been very marked.

TABLE VI.

Showing the distribution of refractive errors in the two groups of visually defective children arranged in two Age-Groups, 5-9 (Period I) and 10-14 (Period II).

Period I.

Jewish total 170.			Non-Jewish total 315.	
42=23.9% 43=24.4%	48.3%	Low Hypermetropia Astigmat. c. „ „	60=19.4% 40=12.7%	32.1%
34=19.3% 23=13.1%	32.4%	High Hypermetropia Astigmat. c. „ „	89=28.3% 72=22.8%	51.1%
16= 9.1% 18=10.2%	19.3%	Myopia Others	32=10.2% 22= 6.6%	16.8%

Period II.

Jewish total 340.			Non-Jewish total 577.	
75=22.1% 48=14.1%	36.2%	Low Hypermetropia Astigmat. c. „ „	110=19.7% 85=14.6%	34.3%
33= 9.7% 22= 6.5%	16.2%	High Hypermetropia Astigmat. c. „ „	90=15.4% 74=12.7%	28.1%
114=33.5% 47=14.1%	47.6%	Myopia Others	148=25.5% 70=12.1%	37.6%

From Table VI it is seen that between the ages of 5 and 9 low hypermetropia (simple and compound) accounts for 48.3 per cent. among Jews and only for 32.1 per cent. amongst non-Jews, whereas 32.4 per cent. and 51.1 per cent. constitute the percentage of high hypermetropia for Jews and non-Jews respectively. The percentage for myopia is remarkably similar, 9.1 per cent. and 10.2 per cent. respectively, though the unclassified errors (anisometropia, mixed astigmatism, and those difficult to classify) show a rather heavier percentage amongst the Jews (10.2 per cent. against 6.6 per cent.). Thus even among young Jewish children low hypermetropia is more common than high hypermetropia, the reverse being true for non-Jewish children. This tends to confirm the suggestion that Jewish children on the whole have a tendency to low hypermetropia and non-Jewish children to high hypermetropia, and that the excessive number of myopes is a

concomitant to the excessive number of low hypermetropes. The quantitative differences in the hypermetropic errors in young Jewish children would explain the qualitative differences in their myopia in later life.

Still it might be argued that whilst it is true that Jews have many more low hypermetropes, that would not explain the rise from 19.3 per cent. of myopia in the first period to 47.6 per cent. in the second period in the case of Jews, whilst in the non-Jews it only rises from 16.8 per cent. to 37.6 per cent. the increase of myopia in the case of Jews being 28.3 per cent. against 20.8 per cent. amongst non-Jews. It might be urged that a difference of nearly 8 per cent. in the myopes is too large when the difference in the incidence of low hypermetropia (in the first period) is only 16.2 per cent. and that, after all, the excessive close work causes the excessive incidence of myopia.

Before such criticism can be countered it is necessary to establish the percentage of low hypermetropes of the first period that become myopes in the second period, and to see whether an unduly high percentage of Jewish low hypermetropes pass over to the myopes. Unfortunately we know but little of this particular phase of the growth of the eye. The procedure suggested is impossible with the available material but the following calculations based on Table VI are an attempt to evaluate the percentage of low hypermetropes (of the first period) who lose their hypermetropia (thus becoming emmetropes or myopes). If close work is responsible for the excessive reduction of hypermetropia, the Jewish children should show a large percentage of low hypermetropes who lose their hypermetropia. Whilst this attempt to reduce the facts to mathematical exactitude might be open to criticism it does not influence the conclusions reached so far on general principles.

Calculation to show the percentage of low hypermetropes in each group who lose their hypermetropia during school life.

Number of	Low	Hypermetropes	among	Jews	in	1st period	=48.3%
"	High	"	"	"	"	"	=32.4%
"	Low	"	"	"	2nd	"	=36.2%
"	High	"	"	"	"	"	=16.2%

Therefore the high hypermetropes of the first period have lost

$$32.4\% - 16.2\% = 16.2\%.$$

It is reasonable to assume that these went over to the low hypermetropes of the second period.

And since the low hypermetropes in the second period constitute 36.2 per cent., 16.2 per cent. of which have been recruited from the high hypermetropes of the first period, there are left 36.2 per cent. - 16.2 per cent. or 20.0 per cent, of the original

48.3 per cent. of low hypermetropes of the first period. Therefore out of 48.3 per cent. low hypermetropes 28.3 per cent. have become emmetropes and myopes; 28.3 per cent. out of 48.3 per cent. constitute a percentage of 58.6 per cent.; therefore 58.6 per cent. of Jewish low hypermetropes lose their hypermetropia. A similar calculation yields a result of 64.8 per cent. of non-Jewish low hypermetropes losing their hypermetropia.

These figures are more favourable to the Jewish low hypermetropes than to the non-Jewish, fewer among the Jews losing their hypermetropic reserve. All the evidence points to the fact that the Jewish myopes are recruited from the low hypermetropes by a perfectly parallel process to that obtaining among the non-Jewish children and the excessive number of myopes is fully explained by the excessive number of low hypermetropes in early childhood, and not by some extraneous factors which turn a hypermetrope into a myope. Taking Jewish children as a whole there is no need to call in any other factor (such as excessive close work, badly illuminated evening schools, etc.), besides the purely racial factor of an excessive incidence of low hypermetropia and a relative absence of high hypermetropia to explain the prevalence of myopia.

SECTION B

An analysis of the refractive errors in relationship to sex

The conclusions reached in Section A might be objected to on the strength that Jewish children and non-Jewish children are not strictly comparable in the one important environmental factor which the figures attempt to prove as being of no importance, namely, the question of close work. To group Jewish boys and girls together is not as justifiable as to group non-Jewish boys and girls to gether.

The non-Jewish boy does no more close work than the girl, but the Jewish boy does decidedly more than the Jewish girl. Most of the Jewish girls do not attend the Talmud Torahs (evening religion classes), and when they do so it is for decidedly less strenuous learning both in quality and time. The Jewish girl is much more closely allied to the non-Jewish boy and girl than to the Jewish boy in the question of excessive close work. It is, therefore, advisable to analyze the refractive errors in four groups —Jewish boys, Jewish girls, non-Jewish boys and non-Jewish girls, and following the subdivision adopted before, classify each group into the two periods of 5—9 and 10—14.

TABLE VII.

Subdivision of the Jewish section of Table VI according to sex.

Period 1.

Boys.				Girls.		
23. 25.3%	45.0%	Low Hypermetropia		19. 22.1%	50.0%	
18. 19.7%		Astigmat. c. „ „		24. 27.9%		
20. 21.9%	34.0%	High Hypermetropia		14. 16.3%	31.4%	
11. 12.1%		Astigmat. c. „ „		13. 15.1%		
8. 8.9%	21.0%	Myopia		8. 9.3%	18.6%	
11. 12.1%		Others		8. 9.3%		
91				86		

Group 2.

Boys.				Girls.		
29. 17.4%	28.8%	Low Hypermetropia		46. 26.8%	42.5%	
19. 11.4%		Astigmat. c. „ „		27. 15.7%		
17. 10.1%	15.5%	High Hypermetropia		16. 9.3%	17.9%	
9. 5.4%		Astigmat. c. „ „		15. 8.6%		
68. 40.7%	55.7%	Myopia		46. 26.8%	39.6%	
25. 15.0%		Others		22. 12.8%		
167				172		

TABLE VIII.

Subdivision of the non-Jewish section of Table VI according to sex.

Group 1.

Boys.				Girls.		
30. 20.0%	31.7%	Low Hypermetropia		30. 18.6%	32.2%	
18. 11.7%		Astigmat. c. „ „		22. 13.6%		
43. 28.0%	54.8%	High Hypermetropia		46. 28.4%	47.4%	
41. 26.8%		Astigmat. c. „ „		31. 19.0%		
11. 7.0%	13.5%	Myopia		21. 13.0%	20.4%	
10. 6.5%		Others		12. 7.4%		
153				162		

Group 2.

Boys.				Girls.		
43. 15.6%	26.9%	Low Hypermetropia		67. 22.2%	39.7%	
31. 11.3%		Astigmat. c. „ „		53. 17.5%		
47. 17.1%	32.0%	High Hypermetropia		43. 14.3%	25.6%	
41. 14.9%		Astigmat. c. „ „		34. 11.3%		
79. 28.7%	41.1%	Myopia		69. 22.8%	34.7%	
34. 12.4%		Others		36. 11.9%		
275				302		

Table VII shows that the refractive errors taken in the broad classification of low hypermetropia, high hypermetropia, and myopia, show but little difference in the case of Jewish boys and girls in the first period (5-9), but in the second period (10-14) the myopes among the boys have gone up from 21 per cent. to 55.7 per cent. against only from 18.6 per cent. to 39.6 per cent. in the case of girls. Thus whilst the Jewish boys have an excess of only 3 per cent. of myopes in the first period over the girls, in the second period the excess is 16.1 per cent. and that in spite of the fact that in the first period the boys have fewer low hypermetropes and more high hypermetropes. The case here seems to be absolutely convincing: coming from the same stock the boys doing excessive close work under unhygienic conditions develop an excessive proportion of myopes (an increase of 34.7 per cent. for boys as against 21 per cent. for girls).

But when one comes to examine Table VIII the conclusions drawn from Table VII are seen in a different light. Here in the first period the boys again have a rather smaller percentage of low hypermetropes and a decidedly higher percentage of high hypermetropes than the girls, whilst in contrast to Table VII the boys have a definitely lower incidence of myopia (13.5 per cent. against 20.4 per cent.), and yet in the second group the myopia among boys has increased from 13.5 per cent. to 41.1 per cent. (=27.6 per cent.), whilst the girls have increased their myopia from 20.4 per cent. to 34.7 per cent. (=14.3 per cent.); the boys, therefore, begining with 6.9 per cent. less myopia and finishing with 6.4 per cent. more than the girls.

The increase in the percentage of myopes (Period II compared to Period I) is therefore as follows:

	Boys.	*Girls.*
Jewish	34.7%	21.0%
Non-Jewish	27.6%	14.3%

The difference in the greater incidence of myopia among Jewish boys as compared to Jewish girls (34.7 per cent. – 21 per cent. = 13.7 per cent.) is fully met by a similar difference among the non-Jewish children (27.6 per cent. – 14.3 per cent. = 13.3 per cent.). Or to put it otherwise, the difference in the rate of increase in the case of the two groups of boys is 7.1 per cent. more myopes for the Jewish boys, but this is countered by the difference of 6.7 per cent. more myopes in the case of Jewish girls as compared to the non-Jewish.

From Section A we have seen that the higher incidence of myopia in the second period in the case of Jews is fully explained by the existence of more low hypermetropes among them and a comparison between Table VII and Table VIII would seem to

explain the great percentage of myopes among Jewish boys as a combination of the racial factor of low hypermetropia and the additional factor of sex which seems to operate more favourably in the case of girls—both Jewish and non-Jewish—in that fewer of their low hypermetropes pass into the myopic group.

To establish this it is necessary to know the percentage of low hypermetropes in each of those subdivisions which go over to the myopes. As in Section A one has to be satisfied with an attempt to find the number of low hypermetropes who lose their hypermetropia. The calculation here is on the same lines as adopted in that section.

Thus for Jewish boys based on Table VII:

Number of	Low	Hypermetropes	(1st period)	...	45.0%
„	High	„	„	...	34.0%
„	Low	„	(2nd period)	...	28.8%
„	High	„	„	...	15.5%

Therefore the high hypermetropes of the first period have lost
34.0% − 15.5% = 18.5%.

Assuming that these 18.5 per cent. went over to the low hypermetropes of the second period, who constitute 28.8 per cent. we are left with only 10.3 per cent. low hypermetropes out of the original 45.0 per cent.: that is 34.7 per cent. out of the 45.0 per cent. low hypermetropes among Jewish boys became emmetropes or myopes=77.1 per cent.

A similar calculation for non-Jewish boys gives the percentages of low hypermetropes which become emmetropes or myopes as 87.2 per cent.

These calculations show that in spite of the greater amount of close work done by Jewish boys their low hypermetropes compare favourably with the non-Jewish boys with low hypermetropia in the percentage that lose their hypermetropia. There is, therefore, no reason to suppose on the strength of these comparisons that excessive close work is productive of myopia.

But there still remains the problem why Jewish boys produce so many more myopes than the Jewish girls. It has already been pointed out that this is also true of non-Jewish boys, and it has been suggested that fewer girls with low hypermetropia become emmetropes and myopes. Adopting the same calculation as we used in the case of the boys we find that among Jewish girls 42 per cent. of the low hypermetropes lose their hypermetropia and 43.4 per cent. in the case of non-Jewish girls, as against 77.1 per cent. and 87.2 per cent. for Jewish and non-Jewish boys respectively. These figures seem to be conclusive. Low hypermetropia among girls in early childhood (5-9) does not tend to become emmetropia or myopia so completely as in the case of boys. We

seem to be dealing here with a sex factor in the growth of the eye. This conclusion is recorded here because it is difficult to see how it could be avoided. But the possible fallacy due to small numbers must be considered.

Much more work is necessary in relation to this sex factor. The whole problem of the growth of the eye requires investigation. What is suggested here is no more than this: that there is no necessity for extraneous factors such as close work to explain the excessive incidence of myopia among a group of people who happen to do much close work. Simpler and more tangible factors would seem to explain the production of the myopia in question. The arguments for the hot-bed theory of the production of myopia are too much of the nature of *post hoc ergo propter hoc*.

It will be the object of a later paper to discuss more fully the part sex plays in the production of anomalies of refraction.

Summarizing, we find that Jewish boys show a heavy percentage of myopes, but we see no reason for ascribing this to the excessive close work done by them. The evidence submitted would tend to show that the racial factor of Jewish children having a low reserve of hypermetropia to start with and the sex determined (and non-racial) factor which allows in the case of boys for a more rapid or more prolonged growth of the eye (we cannot at this juncture say which) fully explains this occurrence.

Summary

(1) The incidence of visual defects among Jewish boys in the East End is over 40 per cent.—double that of the non-Jewish boys.

(2) This heavy incidence of defect among Jewish boys is stationary all through their school life; it is practically no heavier at the age of 14 than it is at 7.

(3) The incidence of the defects is, therefore, not increased with school life, and apparently not produced by the excessive amount of close work done by Jewish boys.

(4) Comparative analysis of the refractive errors seen among the defectives of the Jewish and non-Jewish children reveals but little difference in the distribution of errors apart from a rather higher incidence of myopia and of low hypermetropia among the Jewish children.

(5) There is but little difference in the percentage of myopes in the early years of school life (5-9) in the two groups. The greater incidence of myopia among Jewish children becomes marked in the later years (10-14).

(6) It is argued that the greater increase of myopia in the later years among Jewish children is not the result of excessive close work, but of the greater incidence of low hypermetropia among the young Jewish children.

(7) An attempt is made to establish this contention mathematically.

(8) When the analyses are carried further to bring out any distinction in the increase of the number of myopes among Jewish boys as compared with girls, it is found that the increase is decidedly greater among the boys (who do much more close work).

(9) However, the same is seen to be true of the non-Jewish boys (who do not do an excessive amount of close work) as compared with the non-Jewish girls.

(10) It is, therefore, suggested that there is a sex-determined factor which controls the growth of the eye.

(11) The excessive incidence of myopia among Jewish boys is explained by the racial factor of the great prevalence of low hypermetropia and the sex-determined (and non-racial) factor which allows for a greater or longer development of the length of the eye.

In conclusion I wish to express my indebtedness to Mr. W. J. Lindsay for permission to utilize the records of the Royal Eye Hospital and to Mr. D. Tscherniakoff, the secretary of the Jewish Health Organization of Great Britain for arranging many of the facilities which made the work possible.

To Mr. A. H. Levy I am indebted for suggesting the necessity of the inquiry, for his kindly interest, and the placing at my disposal his great experience and helpful advice.

ANNOTATIONS

The Illuminating Engineer

A special number of *The Illuminating Engineer* was issued in January to celebrate its twentieth anniversary. It is deeply to be regretted that this anniversary also saw the early death of its founder, to whose work so much of its success was due, Mr. Leon Gaster (*v. Brit. Jl. of Ophthal.*, p. 111, 1928). A number of congratulatory messages from the Presidents and Past-presidents of Illuminating Engineering Societies in this country and abroad are published in this issue. The Society is the oldest of its kind in Europe; the only other Society in existence in 1908 was that of the United States, founded in 1906. Twenty years ago the science of illumination was in its infancy, and the conditions in large factories, schools, and public buildings were guided by no

definite rules and were, in nearly all cases, most unsatisfactory. Photometry was then regarded by most people as merely an interesting hobby. In the value now attached to this most fundamental subject the Illuminating Engineering Society and its journal have played a most important part. Government Committees such as the Illumination Research Committee working under the Department of Scientific and Industrial Research are now in existence and doing, as our readers are aware, excellent work, but the pioneers were the Illuminating Engineering Society. The Chairman of our own Editorial Committee, a Past-President of the Society, in his congratulatory note draws attention to the great debt owed by both illuminating engineers and the medical profession to the late editor for his constant efforts to bring them together and facilitate the solution of problems in which they are jointly interested, and also to *The Illuminating Engineer* for acting as the medium by which the results of such researches are made widely known. In offering our congratulations to our contemporary we venture to express our confident hope that the future will be as productive of good work as the past twenty years have been.

Ophthalmic Benefit and Clinics

A letter appears in the supplement of the *British Medical Journal* of February 18, 1928, over the signature M.D., D.O.M.S., which deserves attention. The writer draws attention to the fact that not all the cases in the ophthalmic benefit scheme work out at the simple refraction for a guinea. Of his own cases for the month of January under the scheme, only half were cases of refraction; the others were of diverse kind, many of them had to be seen more than once and some of them frequently. His cases included two Meibomian cysts, which had to be evacuated under cocaine; an abrasion of the cornea, seen four times; a severe interstitial keratitis, seen twelve times to date; acute iritis, seen ten times; angular conjunctivitis and blepharitis, seen thrice; chronic glaucoma, operation, seen seven times at home, besides hospital attendance; severe irido-cyclitis, seen six times to date; a deep septic corneal ulcer, seen twice to date; two patients with neglected foreign bodies on the cornea, both cases with marked infection, which necessitated numerous attendances.

The glaucoma case had already been to two opticians, the second time having been sent by his society. In course of time the writer hopes to receive a guinea for his work from the society, which might as he says, have had to pay the man sick benefit for years. The writer estimates that he has received anything from eighteenpence to a guinea per attendance, and that in his case, a total of sixty-

three attendances divided into twenty-two possible guineas works out at something under 7s. an attendance for the average, but is really less as some of the cases are not finished. Also the acute cases have to be seen and treated as emergencies, the application for benefit being sent in after the patient's attendance. In some of these cases the benefit may be refused. The writer quotes such a case. Some writers have suggested reducing the fee to 10/6 per case. In the writer's case the average time for the attendances would be twenty minutes to half an hour; and the suggested fee, in cases which have to be seen many times is absurd. He says: "is it surprising that some of us feel inclined to withdraw our names at once, and see patients who are poor, and sent by their doctors, in the old way?" We are under the impression that the ophthalmic benefit scheme was intended primarily to cover the provision of spectacles; and that most of the acute cases outlined by the writer of this letter, were calculated as fit and proper cases for hospital treatment. But this does not affect the point which he raises; for it is obviously to the patient's advantage, to continue under the treatment of such a one as the writer who has the special knowledge and even hospital facilities for treatment. Not all those on the ophthalmic panel, are we believe, capable of performing an operation for glaucoma. In the cases where the panel practitioner has the requisite knowledge and ability, he stands the chance of being overwhelmed with work of this kind at a very inadequate remuneration.

The British Journal of Ophthalmology

RECENT DEVELOPMENTS

In the January number we drew attention to recent developments on the part of the journal. These were concerned with monograph supplements and the publication of books. We are now pleased to be able to add that the continued prosperity of the journal has enabled the Board of Directors to assent to a proposal for furthering research, details of which will be found below. It is to be hoped that the proffered scheme of assistance will enable those of our contributors who are in a position to undertake research work to make valuable additions to our knowledge.

The BRITISH JOURNAL OF OPHTHALMOLOGY is prepared to assist research work in ophthalmology by granting subsidies towards the expenses of research to those qualified to undertake such work.

The qualifications of the applicant, the subject of the research, and the place where the work is to be carried out, must be submitted for approval to the Editorial Committee. The applicant must give

some estimate of the probable time and expense necessary to complete the research and indicate the extent of the financial assistance required. The right of publication of papers based on this research must be given to the BRITISH JOURNAL OF OPHTHALMOLOGY. Applications to be addressed to: The Editor, British Journal of Ophthalmology, Ltd., 24, Thayer Street, Manchester Square, W.1.

ABSTRACTS

I.—DISEASE OF LENS

(1) **Weill, G., and Nordmann, J. (Strasbourg).—Cataract and its connection with general pathology. (La cataracte et ses rapports avec la pathologie générale.)** *Ann. d'Ocul.*, Vol. CLXIII, p. 401, 1926.

(1) **Weill** and **Nordmann** enumerate some of the theories put forward in the past to account for the formation of senile cataract (the commonest form): (1) senility affecting especially or unusually early the lens, a condition to which everyone would be subject if he lived long enough, in other words, a physiological change of old age; (2) a result of arterio-sclerosis, which is present in some degree in the majority of patients with senile cataract; (3) auto-intoxication. As some cataracts develop in persons affected with an abnormality of endocrine secretion, it is suggested that possibly senile cataract may be the result of a similar cause. An examination is made of various forms of cataract of constitutional origin.

1. *Diabetic Cataract.*—According to von Graefe 25 per cent. of diabetics have cataract. Fouconneau-Dufresne only found 0.6 per cent. of cataracts in 162 diabetics. This wide difference is due to different methods of classifying cataracts in diabetics. Various writers have reported striking examples of true diabetic cataract in which the opacities of the lens developed to maturity in a few days. The cataract which appears in cases of diabetes with wasting is universally recognized as a complication of the diabetes. This type of diabetes is comparable with that produced experimentally by extirpation of the pancreas. It is recognized as due to an endocrine deficiency. Various theories as to the mode of production of diabetic cataract are reviewed. Although the actual local cause of diabetic cataract is not yet known, it is generally accepted that such a cataract does occur and is connected with hyperglycaemia of pancreatic origin.

2. *Cataract with Tetany.*—Numerous cases of the development of cataract soon after the manifestation of epileptic, hysterical, or

tetanic convulsions have been reported. The patients are usually relatively young adults. Spasm of the ciliary muscle and interference with the nutrition of the lens, or lesions of the ciliary epithelium with alteration in the chemical composition of the aqueous, have been proffered as causes of the cataract. Reference is made to some interesting combinations of events—the coincidence of tetany and epilepsy, of tetany and sclerodermia, and of tetany and myxoedema. Tetany resulting from extirpation of the thyroid gland is sometimes complicated by cataract. A cataract reported by Treu occurred in a patient the subject of all the symptoms of tetany without any convulsions. This is claimed to overthrow the theory of ciliary spasm as the cause of the cataract. A case of chronic parathyroid insufficiency following thyroidectomy suffered from tetany with trophic changes and developed bilateral cataract forty-three months later which underwent operation (Sainton and Péron). Cataract therefore is a symptom of tetany along with the other trophic lesions of the hair and nails.

3. *Zonular Cataract.*—As to the cause of this type of cataract fierce discussions have raged between the school which insists on rickets and that which claims tetany as the cause. In each of these conditions it should be noted that a deficiency of blood-calcium has been recorded. It has been shown recently that a disturbance of calcium metabolism can produce zonular cataract (v. Szily and Eckstein).

4. *Myotonia Atrophicans* (myotonie dystrophique).—In this affection usually the tongue, hands, and fingers undergo contraction lasting up to thirty seconds. The patients are very wasted and display atrophy of the sterno-mastoid, the small hand muscles, and occasionally of the peroneals. There is sometimes a distinctive facies with drooping of the angles of the mouth, and the presence of paresis of the orbicularis oris and palpebrarum. The most constant feature is some abnormality of endocrine glands—testicular atrophy, deficient development of hair, ovarian atrophy, menstrual disturbance, frequent abortions, and sometimes thyroid hyperplasia or under-development. The disease is also familial. Considerable numbers of cases have been reported of cataract as one of the signs present. Series of thirty-five cases (Fleischer) and twenty-two cases (Naegeli) of myotonia atrophicans had cataract. Vogt is stated to doubt the occurrence of this disease without cataract, as habitually the lens had been examined without the microscope and slit-lamp. It is ascribed to numerous causes, namely disease of the central nervous system—brain or spinal cord—a neurosis, a pure myopathy, auto-intoxication, the result of endocrine defect, or an affection of the portion of the nervous system controlling endocrine secretion. Weill and Nordmann

conclude that whatever the basal cause of the endocrine defect which is so commonly a marked feature, the cataract should be classed with those which occur in diabetes and tetany.

5. *Mongolian Idiocy.*—Cataract is a frequent occurrence in this condition. It has been found in twenty-two out of thirty-four cases between the ages of eight and seventeen years and in no case under eight (van der Scheer). The cataract is composed of dots or flocculent opacities in all layers of the lens. By some writers defective function of the thyroid gland, by others the sexual glands, and thirdly a hypophyseal deficiency have been adduced as causes.

6. *Abnormality of Thyroid Function.*—Many opposing views are quoted as to the connection between cataract and thyroid abnormality. Numerous statistics are cited supporting the opposing sides. Some cases of particular interest are: (1) a case of marked infantilism in whom at the age of twenty years cataract in each eye developed side by side with sclerodermia; three similar cases of association with sclerodermia and cataract have been reported; (2) a cataract observed in a young cretin. Although it has been shown that large numbers of cases of goitre found in certain regions are free from cataract, it is claimed that the special cases quoted demonstrate the possibility of a connection between thyroid deficiency and cataract formation.

7. *Cataract in Neuro-dermatoses.*—A small number of cases is referred to, quoted from the literature, in which obscure skin conditions were associated with cataract. Certain of these skin conditions (névrodermite) have been stated to be due to lesions of endocrine glands. It is suggested tentatively that these cataracts may be comparable with those associated with tetany. Cataracts from yet another source are possibly of similar origin—namely, those which develop in ergot poisoning. In this disease, convulsions occur and also atrophy of the hands and the nails, all of which are symptoms present in tetany.

8. *Senile Cataract.*—The form and method of development of senile cataract are similar to those of diabetic and tetanic origin. It is pointed out that the cataract called senile occurs in people who have suffered a considerable change of endocrine activity. It is a manifestation of the climacteric. This may be stated for men as well as for women. It would be expected, if this be correct, to find the appearance of senile cataract at a greater age in men than in women. This is shown to be the case (Schmitt). Among three thousand men and two thousand five hundred women up to the age of sixty years, many more cataracts were found in the women (Gallus). Of the women, eighty per cent. had passed the menopause. It was claimed that the administration of ovarian

extract resulted in marked improvement objectively and subjectively in six cases so treated, and in one the vision improved from 3/60 to 5/18, and in another from 5/15 to 5/5. On the other hand, Ascher found no greater proportion of cataracts in women who had undergone ovariotomy than in normal women. Ovariotomy was recently shown to result in a reduction of calcium and phosphorus salts in the blood (Dalsace). The parathyroids have also been accused (Fisher and Triebenstein). 88.2 per cent. of senile cataract cases were found by careful neurological examination to show signs of latent tetany. In twelve old people without cataract, only one was found to have this condition. This parathyroid deficiency was thought to develop with the involution of the sexual glands.

Weill and Nordmann believe that, as in the case of constitutional cataracts in younger persons, so in old people, cataract is possibly caused by a disturbance of endocrine secretion of some form or another.

HUMPHREY NEAME.

(2) **Gourfein-Welt, Madame L., and Piotrowski, G.(Geneva).—Contribution to the study of the sera of cataractous and non-cataractous individuals. (Contribution a l'étude des sérums cataracteux et non cataracteux.)** *Rev. gén. d'Ophtal.*, January, 1927.

(2) **Madame Gourfein-Welt** and **Piotrowski** here give an account of the continuance of the investigation reported by the former writer in *Rev. gén. d'Ophtal.* for 1925 (Abs. *Brit. Jl. of Ophthal.*, Vol. X, p. 233). The article is statistical and unsuitable for abstraction. Here is a portion of the summary: "We believe that to a certain extent we are able to confirm the results obtained in a former work and to say that a difference exists between the serum of the cataractous and that of the non-cataractous. . . . And, without wishing to draw conclusions from such a small number of cases (26 cataractous and 19 non-cataractous patients are included in the tables in this number of the journal. *Reviewer*) we think we can say that there is a difference between the serum of the cataractous and that of the non-cataractous and that this difference consists especially in the fact that the serum of the cataractous is optically much the more stable."

ERNEST THOMSON.

(3) **Woods, Alan and Burky (Baltimore).—Lens protein and its fractions.** *Jl. Amer. Med. Assoc.*, July 9, 1927.

(3) This study by **Woods** and **Burky** was undertaken as the necessary forerunner of a proposed study of the possible *rôle* lens protein may play in lenticular disease. From 1905 to 1914 Römer

did a considerable amount of work with reference to (1) the effect of lens protein on the blood of various animals; (2) the action of lipoid and various poisons on the lens; (3) the permeability of the lens capsule to toxins; (4) a serological study of patients with cataract; and (5) the effect produced by specific organo-therapy with lens protein. Römer was convinced that the formation of cataract was due to a reaction taking place between the blood serum of the patient and the protein of the lens, though he was unable to prove this by experimental research.

Guyer and Smith, although primarily interested in the immunological reactions of lens proteins, took advantage of the fact that in embryonic life the lens is surrounded by the tunica vasculosa and is therefore more subject to influences from blood serum than would occur later in life. These observers immunized fowls to rabbit lens protein producing anti-rabbit lens serum. This serum was then injected back into pregnant rabbits at intervals of two or three days over a period of two weeks. There was a high mortality among these rabbits and the embryos; but among the 61 young surviving, nine showed ocular defects centred chiefly in the crystalline lens; imperfect development or liquefaction of the lens; partial or complete cataract; or other ocular lesions which, in the opinion of these authors, were due primarily to the imperfect development of the lens.

It is to be noted that some who have read the original paper by Guyer and Smith (among these the reviewer), have not been entirely satisfied that the strain of rabbits on which their experiments were made, constantly exhibited entirely normal eyes and lenses, as determined through many generations by an expert ophthalmologist.

By chemical means the aqueous extract of animal lenses can be separated into *alpha* antigens and *beta* antigens, and methods have been elaborated for the preparation of these substances in a condition of purity. Study of these serologically pure fractional antigens shows that they are organ specific and not species specific.

A. F. MACCALLAN.

(4) **Kast, R. (Zürich).—Cataract after thyroidectomy. (Katarakt nach Strumektomie.)** *Zeitschr. f. Augenheilk.*, Bd. LIX, S. 357, 1926.

(4) The cataract which follows accidental injury to the parathyroid glands in the course of operative removal of the thyroid is a well-known clinical entity. **Kast** has made its morphology as seen through the slit-lamp a subject of special study, and, contrary to the opinion of some, he considers that a differential diagnosis can be made distinguishing this from other forms of

lenticular disturbance. The two distinguishing features he stresses are:

(1) There is a thin layer of discrete opaque spots situated immediately under the anterior and posterior capsules. These are occasionally vacuolated, the vacuoles being flattened in a dorso-ventral direction. They tend to be segregated in the polar regions, especially in the posterior pole, and hence the visual disturbance, even in the early stages of cataract formation, is considerable. They frequently show up the arrangement of the fibres of the lens, and the pattern of the sutures.

(2) The lens is constricted sagitally. The diameter is of normal proportions (8 mm. to 9 mm.), but the thickness is definitely sub-normal, being on the average only 3 mm.

Although subcapsular, the cataract is not strictly cortical, for the layer of opacity is extremely thin. Nuclear sclerosis may frequently follow at a later stage, but usually the remainder of the lens substance remains clear. The prognosis on extraction is good (fourteen cases) since only very slight cortical remains are left.

W. S. DUKE-ELDER.

(5) **Betsch, A. (Tübingen). — Seven cases of bone formation in the lens. (Sieben Fälle von Knochenbildung in der Linse.)** *Klin. Monatsbl. f. Augenheilk.*, Bd. LXXIX, S. 48, 1927.

(5) Cases of true bone formation in the lens are relatively rare. **Betsch** reports seven fresh cases. In four of the cases the eye was enucleated for phthisis bulbi developing some considerable time after a trauma (blow, perforating wound, etc.); in one case phthisis developed thirty years after a nodular iritis for which an iridectomy had been performed, in one case after the development of a metastatic abscess in the vitreous, and in the remaining case in an eye which, seventeen years previously, had a tuberculous keratitis followed by a corneal ulcer which had perforated and had left a staphyloma. The microscopical appearances of these are given in detail. In each there was considerable bone formation in the lens, with the formation of regular and typical Haversian systems, while the iris and ciliary region showed marked atrophic degeneration.

W. S. DUKE-ELDER.

(6) **Pesme, Paul (Bordeaux).—The extraction of the transparent lens in high myopia. (L'extraction du cristalin transparent dans la myopie forte.)** *La Clin. Ophtal.*, June, 1927.

(6) **Pesme**, in agreement with his teacher Lagrange, considers that the abandonment by so many surgeons of the Fukala-Vacher operation is not well merited. He relates in detail a number of

cases operated on by Lagrange and others, and afterwards explains the desiderata for and the decided limitations of this operation. Coming as it does from such a well-known school one needs no excuse for a partial transcription of this part of Pesme's article.

"The operation which best satisfies the patient is that which gives useful vision at any distance without the necessity for glasses. This ideal is reached in patients who can see at a distance with one eye and can use the other eye for near vision. Our own observations and those of others confirm the fact that abolition of the transparent lens in myopic eyes results in a loss of refractive power equal to 20 dioptres. Consequently the operation in a myope of 20 dioptres should result in emmetropia. If one goes beyond 19 or 20 dioptres there will be a residual myopia after the operation and if one operates on a lower myopia there will be hypermetropia. In each of these cases glasses will be required. The patient should be under 25 years of age, or one may say that the conditions for operation are two, namely, 20 years of age and 20 dioptres of myopia. It is, of course, to be understood that the patient is in good general health and that there are no macular lesions, progressive chorio-retinitis or marked softening of the vitreous." One is inclined to ask what percentage of high myopes fulfil all these conditions. That it is small is realized by the writer himself when he says of the operation *"le cadre de son application est très limité."*

ERNEST THOMSON.

(7) **Demets (Antwerp).—The remote results of operation on congenital cataract. (Résultats éloignés de l'opération des cataractes congénitales.)** *La Clin. Ophtal.*, June, 1927.

(7) **Demets** refers to a case in which Moreau operated on a born-blind individual, aged 8 years. The cataract operation was technically perfect, but eleven years afterwards the vision remained rudimentary. Demets seems to wish to counteract the disheartenment which might tend to follow the publication of such a case and relates several in which the results were excellent. Among these is a remarkable family. "I knew a medical family in which cataract developed in five successive generations; in the three last the cataract was complete at birth and was operated on *tout de suite*—I was myself concerned in the two last. The results were excellent and have remained so ever since." Demets suggests the following factors bearing upon the success of operation in these cases:

(1) Has the child been able to see since birth or not?
(2) What is the child's age when one is asked to operate?
(3) Is the cataract accompanied by other deep lesions which are sure to make the operation valueless?

(4) Is the general condition good or are there signs of cerebral or spinal degeneration?

ERNEST THOMSON.

(8) **Wessely, K. (Munich).—Concerning the technique of operation for secondary cataract. (Zur Technik der Nachstaroperation.)** *Arch. f. Augenheilk.*, Vol. XCVIII, May, 1927.

(8) **Wessely's** experience has led him to the conclusion that no other instrument can cut through the secondary cataract so lightly as a lancet. The special lancet he has devised and uses has a blade 10 mm. long, whose base is 4 mm. broad; the blade makes an angle of 130° with the stem and the edges of the blade are ground as sharp as possible. The advantages claimed for this instrument are: Unlike the needles and knife-needles usually employed, it enables one to place the incision anywhere around the limbus to suit the case in hand. The anchored strand or membrane gets divided with the least traction on its mooring. Where the membrane or strand is too tough for the lancet, the same incision permits of a specially made de Wecker's scissors being introduced into the eye to divide it—the most important advantage of the lancet over other instruments. While the incision is small enough not to favour vitreous prolapse, it is big enough to allow escape of aqueous and thus wash out any infection that may have been carried in by the instrument from the conjunctiva. He has had to resort to de Wecker's scissors in about one case in ten. In practically every case a single operation suffices to give an optically satisfactory gap.

The author's modification of de Wecker's scissors consists in the blades being particularly fine, 8 mm. long and hardly 1 mm. broad, one of the blades sharp-pointed.

He insists that darkening the operating room, oblique illumination with a hammer-lamp, and wearing a moderately magnifying loupe, should never be omitted as they are important factors that tend to assure a good result of the operation.

D. V. GIRI.

(9) **Tennent, J. N. (Glasgow).—Cataract extraction with peripheral iridectomy.** *Lancet*, December 3, 1927.

(9) **Tennent** has been impressed by the work of Meller whom he visited at Vienna. He had the opportunity of seeing this well-known surgeon's cataract work and quotes his results as given by Barkan of San Francisco. Tennent discusses the advantages and disadvantages of the three methods commonly employed, namely, simple extraction, with ordinary iridectomy, and with peripheral iridectomy. Employing peripheral iridectomy, Meller had only two cases of iris prolapse out of 180 operations, whereas this

complication occurred twice out of 46 cases of the combined operation. The principal portion of Tennent's communication deals with two cases in particular, in one of which the site of operation was studied with the slit-lamp and in the other with the microscope, the patient in the latter case having died of pneumonia some weeks after a successful cataract operation. Both these cases had had peripheral iridectomy. In the first case there was a small black mass of pigment under the conjunctiva on the outer surface of the wound above one edge of the gap in the iris. Underneath this on the posterior surface of the cornea there was a dark flattened area of proliferating epithelium. This was not so densely black as the outer nodule, it was more rarified and flattened and showed dark radiating lines like those on the wing of a fly. Had a microscope section been available, the author feels sure that pigment would also have been seen extending through the wound. The visual acuity was 6/6 and J.1. with correction, there was no anterior synechia and the patient had no complaint. The other eye was successfully operated on and presented no complication whatever. Tennent suggests that the eye with the pigment in the wound is more likely to suffer from late infection than the other. In the second case the microscope showed that, while a portion of the stroma of the iris had been removed, the corresponding portion of the pigment epithelium had been left behind. "This pigment layer has torn through at one point; it might easily tear at another point and then it would lie free in the anterior chamber, and readily pass into the corneal wound; this would give rise to the condition seen clinically in Case 1." Examination of a section passing near to the hole in the iris showed that the line of separation had been between the two layers of pigment epithelium. The author concludes that if the operation with peripheral iridectomy is decided on it is very necessary to be sure that the whole of the iris thickness is removed, and that, if the case presents features suggestive of an increased risk of infection, total rather than peripheral iridectomy should be performed. And there are other types of cases in which peripheral iridectomy is not advisable. In highly pigmented irides it is thought that this is associated with increased toughness of iris tissue and that the iris is less susceptible to atropine. And, of course, in any case where there is increased risk of prolapse of vitreous, as for instance, in high myopia, peripheral iridectomy which is usually performed after the extraction of the lens, is out of place. Apart from such exceptional cases Tennent thinks that the operation with peripheral iridectomy will largely replace simple and combined extraction.

ERNEST THOMSON.

(10) **Greeves, R. Affleck (London).—Cataract extraction with peripheral iridectomy.** *Lancet*, December 10, 1927.

(10) With reference to the foregoing article by Tennent, **Greeves** writes to the editor of the *Lancet* to say that he has had many years experience of the operation for cataract with peripheral iridectomy, and that, in his opinion, it is the one which gives the best results. That the operation finds favour with the Moorfields staff is indicated by the fact that it was performed at Moorfields 846 times between the years 1919 and 1925. Greeves has never known of loss of vitreous after removal of the lens in consequence of the performance of a peripheral iridectomy. He gives three indications for the performance of complete iridectomy, namely, the presence of posterior synechiae, a rigid pupil, failure of the iris to remain in position after having been replaced. In his experience a small mass of uveal pigment in the wound has never given any trouble provided that the iris itself has remained entirely free.

ERNEST THOMSON.

(11) **Pesme, Paul (Bordeaux).—Congenital opacities of the anterior polar region of the crystalline lens and their correlation with malformations of the pupillary membrane. (Les opacités congénitales de la région polaire antérieure du cristallin et leur corrélation avec les malformations de la membrane pupillaire.)** *Arch. d'Ophtal.*, October, 1927.

(11) In this paper which contains six illustrations in the text, and to which is appended a list of thirty-one references, **Pesme** reports five examples under his own observation, clinically and pathologically, at considerable length.

The employment of the slit-lamp and corneal microscope has drawn the attention of observers to the co-existence of remnants, more or less abundant, of the pupillary membrane and diverse opacities of the crystalline lens. This concomitance of two varieties of congenital anomaly has furnished an explanation of the origin of certain forms of cataract by a malformation or faulty development of the pupillary membrane.

Beck, in 1838, appears to have been the first to describe this association of pupillo-lental anomalies: in 1886 van Duyse described several cases of persistent pupillary membrane, in some of which he noted the co-existence of lental opacities. From that time onwards numerous reports have appeared, in many of which attention was called to the relations which might exist, from the point of view of pathogenesis, between malformations of the pupillary membrane and forms of anterior polar cataract. Vogt (1921) in a long paper described cases showing many varieties of congenital cataract accompanied by more or less

abundant vestiges of pupillary membrane. In some of his cases, as in those of other observers, opacities on the anterior capsule have been associated with opacities in the lens substance, sometimes near the anterior pole, sometimes near the nuclear area.

A study of the earlier observations and of his own cases, leads the author to suggest the following groups, according to the variety of lens opacity:

(*a*) Anterior polar cataract (central punctiform).

(*b*) Pyramidal cataract.

(*c*) Capsular punctiform coronal cataract (called by Pesme "cataracte en taches de bougies" and by Vogt "Kapselstarflecken").

Each of these varieties may or may not be associated with opacities deeper in the lens. Each may also be combined with more or less abundant remnants of pupillary membrane which may exhibit considerable variation.

Among the congenital cataracts associated with pupillary membrane malformations, anterior polar and pyramidal forms are well known. But the anterior capsular cataract in the form of scattered spots, described by Seggel, Thomson, Terrien, Vogt and the author were not known with precision before the advent of the slit-lamp.

In the second part of his paper Pesme gives a résumé of the views of earlier writers on pathogenesis and expounds his own. He also devotes two pages to the "origin and nature of congenital pigmentation of the anterior lens capsule." The final paragraphs of "conclusions" contain a brief representation of his views: At the present time there are sufficient observations concerning congenital opacities of the anterior pole of the lens, associated with malformations of the pupillary membrane, to justify the conclusion that in a considerable proportion of cases, congenital anterior capsular cataract originates in a faulty development of the pupillary membrane. This view of the aetiology differs widely from the earlier view so generally accepted of perforating or non-perforating keratitis. Among the clinical forms whose origin is as stated, that described as anterior capsular cataract of coronal type finds a place.

The cause of these congenital cataracts is an inflammatory process, most frequently heredito-syphilitic in origin, which attacks the pupillary blood-vessels of the pupillary membrane; by this path it reaches the lens; if it attacks the envelope only it gives rise to capsular cataract; but it may also affect the subjacent lens fibres; if the attack is brief it leads to the formation of an opacity near the surface, but if of long duration a fusiform or perinuclear opacity may result.

The congenital pigmentary deposits on the anterior lens capsule are usually discrete; they are more abundant when associated with congenital opacities; they are derived from the retinal pigment epithelium which extends along the pupillary membrane to form the *pars iridica retinae*. Fragmentation of the retinal pigment occurs followed by its dissemination either in a free state or by the agency of migratory cells which follow the pupillary blood-vessels. In the normal state the pigment débris disappears almost totally, but following inflammatory conditions it persists in larger quantity as shown in cases of anterior polar cataract.

J. B. LAWFORD.

II.—MISCELLANEOUS

(1) **Mayou, M. S. (London).—Siderosis.** *Trans. Ophthal. Soc. U.K., 1926.*

(1) Mayou (in continuation of a paper read before the Society in 1925) advanced the theory that in siderosis the iron is present in the eye in colloidal form; in confirmation of which R. H. Ward examined two specimens of human eyes and the eyes of three rabbits, the subjects of siderosis, and found the iron in colloidal form in every instance. With the exception of sclerosis of the blood-vessels of the retina, due probably to contact with the iron in the lymphatic sheaths, the endothelium is little affected, and the epithelial cells are those which retain the iron, show most changes, and suffer most. The changes due to siderosis are as follow:

Conjunctiva and cornea.—Epithelium stained when the iron is protruding in the conjunctival sac. Connective tissue only stained in the wound in close proximity to the iron.

Anterior chamber.—When a piece of iron is placed in the anterior chamber comparatively little staining of the tissues and destruction of epithelium takes place. The endothelium on Descemet's membrane is not affected, except in extreme cases.

Iris.—The deposit of iron on the anterior surface is only locally around the foreign body when the iron is in the anterior chamber, but the superficial layers of the iris may be impregnated when the iron has made its way forward from the vitreous. The sphincter and dilatator muscles contain considerable amounts of iron, whereas the ciliary muscle is not affected. The pigment epithelium on the posterior surface of the iris is little affected.

Lens.—For the colloidal iron to enter the lens, its capsule must be damaged. Diffusion then takes place around and between the fibres of the lens. After a time death of the epithelial cells takes

place, and they, together with a certain amount of débris from the breaking up of lens substance, become agglutinated and form collections beneath the lens capsule, which are so characteristic of the condition. In cases where these brown spots have been seen in what appear to be clear lenses, it is probable that the posterior capsule has been ruptured as a result of the concussion.

Ciliary body.—The epithelium of the ciliary body and ora serrata contains a considerable amount of iron, especially the cells lying at the bottom of the crypts. The iron is contained principally in the innermost layer of the epithelium, and between it and the outer layer. After a time the outer layer seems to be destroyed and the pigment epithelium is attacked and bleached, the cells discharging their pigment. The destruction of cells may lead to a more albuminous fluid passing into the anterior chamber, accounting for the frequent termination of untreated cases in glaucoma.

Retina.—In the early stages a good deal of the iron collects upon the internal limiting membrane and the inner layers of the retina. Some collects upon the external limiting membrane, but the rods and cones are practically free. After a time oedema occurs, and finally complete atrophy with disappearance of the rods and cones takes place. The retinal pigment cells are early affected, which no doubt accounts for the night-blindness in the early stages.

Optic nerve.—The brown discolouration of the disc is due to colloidal iron lying on its surface, carried there by means of the canal of Cloquet.

Choroid, ciliary body, and sclera are not affected unless the iron is directly embedded in them, as they are protected from the diffusion of colloidal iron by the membrane of Bruch.

G. G. PENMAN.

(2) **Duke-Elder, W. S. (*London*). — Phototherapy in ophthalmology.** *Trans. Ophthal. Soc. U.K.*, 1926.

(2) Duke-Elder divides the treatment into "general phototherapy" and "local phototherapy," the first of which has been dealt with by Goulden (see below). Before radiating an eye the minimal erythema dose for the skin is first determined, and that necessary to produce a reaction on the eye is estimated as slightly less than this. Working with a quartz director at half a metre the average person gets a mild reaction after an exposure lasting two and a half minutes: above this intensity a marked photophthalmia leading to tissue destruction may result. In radiating the eye, when an irritating effect is desired, rays shorter than 3,000 A.U. are used, controlled so that they do not fall on the

lens: when a mild abiotic effect or analgesic action is wanted rays from 3,000 to 4,500 A.U. are used.

Diseases of the Lids.—Chronic blepharitis responds very well to the unfiltered radiation. *Conjunctival Diseases.*—The most satisfactory results are obtained by giving intensive doses of five minutes up to twenty or thirty minutes. These cause a sharp reaction, followed by desquamation. "During the exposure the cornea is protected either by holding down the everted lid over it, or by a cardboard support, which at the same time keeps the everted lid in position, and allows of its radiation through a hole cut to conform to its shape."

Good results have been obtained in cases of chronic catarrh and of trachoma, especially the acuter forms.

Corneal Ulcers heal well with a considerable amount of local opacity, but this becomes highly vascularized and largely disappears. Little result is obtained with interstitial keratitis or corneal opacities. A useful bibliography containing 34 references accompanies this paper.

G. G. PENMAN.

(3) **Goulden, C. (London).—The value of ultra-violet rays.** *Trans. Ophthal. Soc. U.K.*, 1926.

(3) **Goulden** draws attention to several groups of cases in which a certain amount of experience with ultra-violet rays has been gained. *In tuberculosis* of the iris and ciliary body a means of cure seems to have been found by this means, and three very brilliant cases are quoted. *Phlyctenular* conjunctivitis and recurrent corneal ulcers in children respond extraordinarily well to the treatment, which is combined with routine ear, nose, and throat examination, with removal of tonsils and adenoids if necessary. Other conditions, such as episcleritis, sclerosing keratitis, and chronic irido-cyclitis, have not shown marked improvement. The striking results have all been obtained in children and adolescents.

The *apparatus* used is: (*a*) the naked carbon arc and (*b*) the mercury vapour lamp. *Dosage.*—"At the London Hospital, where treatment has been used for the last three years, an initial exposure of half an hour to the arc lamp and two minutes to a 6-inch mercury vapour lamp" at three feet has never had unpleasant results. Erythema of the skin may occur, followed in a few days by desquamation. Brunettes give a more severe reaction and deeper pigmentation. "The dosage is increased at weekly intervals by half hours up to a maximum of four hours daily with the arc lamp and by one minute weekly up to a maximum of twenty minutes daily with the mercury vapour lamp. Each side of the body is exposed at the sitting. When there is a break in

the treatment, an interval of four days does not need any alteration in the time of exposure." An interval of a month necessitates starting again at the beginning. A fortnight's break requires a halving of the maximum that has been reached.

G. G. PENMAN.

(4) **Bentzen, C. F. — General light-bath treatment in some diseases of the eye.** *Acta Ophthal.*, Vol. V, p. 29, 1927.

(4) **Bentzen** reports nineteen case of various eye conditions which were treated by general light baths. The technique employed was that practised at the Finsen Light Institute, the carbon arc being used throughout. Treatments were given every second day, the initial exposure being a quarter to half an hour increasing to a maximum of two and a half hours.

Irido-cyclitis: ten cases. Of these six cases were considered tuberculous. In four the result was good; the disease quietened down leaving the eye in good condition with useful vision; one, after thirty-six light baths, showed no improvement at all; one appeared to recover, had a relapse, and then was lost trace of owing to removal into another district. Four cases were of doubtful aetiology: of these two cleared up with light treatment after other methods had failed, and two showed no improvement. While recognizing that his statistics are small, Bentzen concludes that light therapy has a markedly beneficial action in tuberculous cases, while in others, its results are more unreliable and incalculable.

Phlyctenular kerato-conjunctivitis: four cases. In two of these the eyes recovered; two were untraced. There was no effect on the tuberculous adenitis which accompanied the conjunctivitis.

Tuberculous scleritis: one case. Result negative, after five weeks' treatment.

Sclerosing keratitis: one case. Good result, the eye quietening, with cessation of the relapses and the return of useful vision.

Gono-rheumatic iritis: one case. An apparently "inveterate" case; eye almost free from injection after three treatments; patient lost sight of.

Recurrent vitreous haemorrhages: one case; no effect.

Chronic kerato-blepharo-conjunctivitis. One case of thirty years' standing; an "excellent effect."

W. S. DUKE-ELDER.

(5) **Funaishi, Sh. — On the subjunctive eye (the third eye).** (From the Department of Ophthalmology, Manchuria Medical College, Mukden.) *Arch. of Ophthal.*, July, 1927.

(5) **Funaishi** has elaborated a series of ingenious tests which show that the imaginary cyclopic eye, first postulated by Hering

and Helmholtz is situated, not midway between the two eyes, but at the articulation of the occipital bone with the vertebral column. His tests also show that the centre of uniocular vision is located here. The more important of these tests are as follow:

(1) Close the left eye, hold a pencil horizontally in front of the face about 30 cm. away and move it as if its end were directed towards the closed eye. On opening the left eye the pencil will be found to point towards the bridge of the nose.

(2) Look at an object some distance in front with one eye, say the right, and hold a pencil close to it so as to cover the object with its end. Now open the left eye and it will feel as though the pencil has moved to the right and upwards from the object.

(3) Look across a table at a row of paraffin balls on the other side of it at the height of the eyes, close one eye and mark with pencil on paper on the table several points along the direction from the closed eye to each paraffin ball. The extension of these lines will pass through a small area situated about 10 cm. behind the vertical plane of the eyes in media. If the row of balls is placed vertically, the converging area is found about 10 cm. behind the eyes and 4.5 cm. beneath them, *i.e.*, in the head articulation.

(4) If a closed eye, or a seeing eye through a tube, is pointed with a finger from the side, the finger will direct slightly behind and below the opening of the ear.

(5) If a pencil be held horizontally with both hands behind the head at the height of both eyes, it practically stands just at the height of the head articulation. The author's conclusions are:

I. We have two organic eyes but transpose them optically and subjectively at the head articulation (articulation of occipital bone with vertebral column) where the centre of visual direction lies.

II. We find no difference between the eyes thus transposed in actual vision. Hence we have only one subjective eye which may be called "the subjective cyclopic eye or the third eye."

F. A. WILLIAMSON-NOBLE.

(6) **van der Hoeve, J. (Leiden).—Co-operation of direct observation with the use of the magnet in the diagnosis of intra-ocular foreign bodies. (Co-operation de l'observation directe et l'aimant dans le diagnostic des corps étrangers intra-oculaires.)** *Ann. d'Ocul.*, Vol. CLXII, p. 286, 1925.

(6) **van der Hoeve** points out that the first essential is to prove that a foreign body which has penetrated the eye is magnetic. The *history* of the use of only steel utensils points towards this

in the presence of a penetrating wound. In addition other observations may give much information.

(1) *The wound.*—A wound which penetrates the coats of the eyeball may have been caused by a contusion in which a point of the foreign body punctured the globe and the object then fell back from the eye. Usually a wound produced by a body which penetrates the eye is quite distinctive from one caused by a contusion. In the case of very small penetrating wounds the binocular loupe or the corneal microscope and slit-lamp enable a certain opinion to be formed as to perforation. In cases of sclerotic wounds there is less certainty.

(2) The presence of a *wound of the iris or of the lens* capsule, or a cloudiness of the lens renders the diagnosis of the entry of a foreign body still more certain.

(3) The presence of *air* in the eyeball, especially in the vitreous is also of value.

(4) *Direct observation* of a foreign body by means of a loupe or corneal microscope for the anterior parts of the eye, and by an ophthalmoscope for the posterior part, gives certain evidence in some cases. In more, however, a foreign body is obscured by cloudiness of the media, by blood or by exudate.

(5) *Radioscopy or radiography* show the presence of a foreign body except when this is very small. Its location within the eyeball can be determined by taking landmarks and by observing whether the shadow of the foreign body moves with movements of rotation of the eyeball. In three circumstances the observations may lead to error. (*a*) If the foreign body is at the centre of rotation of the eyeball its shadow will not move. (This position can, however, be determined by direct observation or by measurements of the distance of the shadow from the marks.) (*b*) If the foreign body is in a tendon or muscle it will move, but less extensively than if within the eye. (*c*) If fixed to the surface of the eyeball the position of a foreign body is more difficult to determine.

(6) *The magnet* will cause pain in the case of magnetic substances except when the foreign body is very small or is fixed in a relatively insensitive structure.

(7) *The galvanometer* gives a positive result in every case of magnetic foreign body, even when very small. If at first the galvanometer needle is not deflected the giant magnet should be used, as a result of which an iron foreign body becomes magnetized and then more readily deflects the galvanometer needle. By the application of the galvanometer to different parts of the eyeball, while the latter is moved in different directions, definite information as to the position of the foreign body may be obtained.

(8) *Examination of a visible foreign body with the ophthalmoscope or loupe before and after the application of the magnet.* If the foreign body, or exudate covering it, is found to have altered its position, it is certainly composed of a magnetic substance. A negative result is not conclusive, for such a foreign body may move under the influence of the magnet and return to its place when the current is cut off. van der Hoeve asserts definitely that, in the case of a visible magnetic foreign body, under examination by the loupe, corneal microscope or ophthalmoscope, in proximity to the giant magnet, the foreign body can always be seen to move when the electric circuit is closed. It is wise to use a hand magnet first in case the foreign body is not firmly embedded, and if to this test a negative result follows, the giant magnet should be used. van der Hoeve reports in detail four cases in which this combined method of examination was of use. In one it determined the magnetic nature of a foreign body, which was not possible by any of the other methods. In another it showed that the foreign body was bound to the retina by bands, and indicated that a transcleral route was necessary for its extraction. Vision of 5/10 followed this operation. In the third case it gave information as to the progress of the extraction of the foreign body and prevented the unnecessary adoption of a change of method. In the fourth case, it demonstrated that one of three spots visible with the ophthalmoscope was a magnetic foreign body. This was extracted by the anterior route.

The anterior route is advocated except in cases where the foreign body is firmly fixed to the retina and where the use of the giant magnet is liable to cause retinal detachment. In such cases two parallel scleral sutures (not perforating) are arranged meridionally in a situation as near as possible to the site of the foreign body, beneath a large conjunctival flap. A meridional incision is made between the sutures through the coats of the eye into the vitreous cavity. The sutures are held up by an assistant so as to cause the wound to gape. A hand magnet removes the foreign body. The sutures are then tied without the loss of any vitreous, and the conjunctival flap closed.

(A simple and useful additional help in the localization of a very small body or one not completely opaque to X-rays, is the use of a dental X-ray film as advocated by Vogt. The edge or corner of the film is pressed backwards on to the skin between the eye and the nose as far as possible in a sagittal plane. The X-ray tube is arranged to the temporal side. Such a radiograph shows the presence of foreign bodies of very small size in the anterior half or third of the eyeball.—H.N.)

HUMPHREY NEAME.

BOOK NOTICES

Strabismus. Its Aetiology and Treatment. By OSCAR WILKINSON, M.A., M.D., D.Sc. Pp. 240 with 120 illustrations. London. Henry Kimpton, 1928. Price, 42s. net.

The aetiology and treatment of strabismus form a subject which can always be relied upon to produce an animated discussion in any gathering of ophthalmologists. The author seems to have felt this in the compilation of his book as he has been at great pains to give long quotations from various other writers on the subject. He divides the theories of the aetiology of squint into four groups: the muscular theory, which attributes the defect to an overacting muscle; the accommodation theory of Donders; the fusion theory of Javal, Parinaud, Verhoeff, and Worth, and finally the nervous theory which is the author's favourite. It is a little difficult to gather from the text what this theory means, as it is made to include "not paralysis, but the results of paralysis or disease," also cases where there has been destruction early in life of the foveal region of the retina and loss of the "foveal guide," while alternating strabismus is assigned to "an exclusively cortical or nuclear abnormality, probably due to malformation or an eccentric nerve habit."

After the chapter on aetiology, there follow sections dealing with anatomy and physiology and then one devoted to classification of the different types of strabismus. In a later chapter dealing with measurement of the defect the author lays it down that "if at any age the degree of squint is not decreased after four to six months of careful attention it becomes an operative case." His reasons for this are that the power of fusion can seldom be acquired after the age of six and that it is much easier to acquire it after the eyes have been put straight. Also, the longer the eye remains crossed the more complete is the suppression of vision in the deviating eye. The description of non-operative treatment follows conventional lines, but the reader is given a useful reminder "that the patient with the squint is an abnormal patient and he should receive a physical and neurologic examination." For example, toxic conditions in the teeth, tonsils and intestine must be dealt with, if present.

Operative treatment is very fully described and some interesting observations are made, thus: The surgeon's object in a squint operation is to obtain an accurate result and this can be brought about only by a careful and painstaking technique. For example, if a muscle is to be shortened it should be shortened by a definite amount which should be measured on a special strabismus rule

designed by the author. He also suggests that the power of the muscle should be gauged by a small spring balance. The operation of his choice is resection, performed if necessary on both eyes with the use of a strabismus brace—described in the text—to keep the eye in position during healing. By this means 9°—20° of deviation can be rectified, depending on the length of muscle removed, resection of 6 mm., reducing 9° of deviation and of 12 mm., 20°. In deviations of a larger amount, or where it is desirable to restrict operative procedures to one eye, the combination of recession of one muscle with resection of its opponent is to be recommended.

One feels in reading this book that it might with advantage have been shortened, and that the author instead of giving long literal transcripts from various authorities, often mutually contradictory, could have achieved the same object by a brief summary of their views. When one reads a text-book on some subject by an author of renown, one reads it in order to profit by his own experience and judgment. The views of others can easily be ascertained in a library and it seems a pity to expend so much space in giving a large number of extracts from various standard works, many of which will already have been read by those who consult this volume.

La Tuberculosis en los Ojos. By Dr. J. LIJÓ PAVÍA. Pp. 177. Buenos Aires, 1926.

This small monograph forms a good example of the growing amount of ophthalmological work which is being done to-day in South America. It deals extensively with a series of 280 cases of tuberculosis of the eye which have come under the observation of the author, an interesting and critical study being made of their clinical manifestations, diagnosis, and treatment.

The disease is dealt with in four groups as it occurs in the conjunctiva, the episcleral and scleral tissues, the cornea, and the uveal tract. Tuberculosis of the conjunctiva appears to be very common in the Argentine; of the 280 cases only 72 had a normal conjunctiva, and the author concludes that 83 per cent. of tuberculous cases have conjunctival disease. The method of diagnosis largely relied upon is a reaction of the conjunctival lymphatics to a provocative injection of tuberculin, but the final test of microscopical examination of the tissues was carried out in many cases. This geographical incidence is interesting, and makes this part of the monograph valuable. The various types differentiated are as follows: diffuse, ulcerative, nodular, vegetative, lupus, and mixed. In discussing tuberculosis of the episcleral tissues, the author expresses the view that the majority of cases of phlyctenular disease are of tuberculous origin. Twenty-nine cases of tuberculous keratitis are described in detail: a tuberculous interstitial keratitis

is suggested by its peculiar obstinacy, the failure of response to syphilitic treatment, and the presence of a negative Wassermann and a positive tuberculin reaction. The manifestations of the disease in the uveal tract are reviewed according to the orthodox lines. In treatment tuberculin is stressed; it is said to be irritative in action, destroying the organisms by exciting an inflammatory reaction of an allergic nature and thus causing the disappearance of the tuberculous foci.

Clínica Oftalmológica Iconográfica Esquemática de Enfermedades y Anomalías. By Dr. M. MENACHO. Pp. 431 with 360 illustrations. Barcelona, 1927. Librería Bosch.

Dr. Menacho of Barcelona has gathered together in book form those cases which he considers are of more than usual interest which he has met with in a long and busy life in ophthalmological practice. The series comprises some two hundred cases and embraces all sorts and conditions of disease and anomaly. In each the history is given, the clinical appearance and symptoms described, the treatment and the further developments detailed. The text is liberally illustrated with schematic drawings. Many of them are of considerable interest, and many of them are rarities, and their sequence is pleasantly relieved by the reflections of the author interpreting and analyzing them. The collection is a valuable one, and suggests a sustained and careful interest, and an industry and enthusiasm which must be rare.

Ultra-Violet Rays in the Treatment and Cure of Disease. By PERCY HALL. Third edition. Pp. xviii + 236 with 57 illustrations. London: Heinemann, Ltd. 1927. Price, 12s. 6d. net.

Although it is only three years since this book was first written the rapid growth of our knowledge of the biological and therapeutic effects of ultra-violet light has made it necessary completely to re-write and greatly to enlarge it in its present third edition. This of itself, while it indicates the extraordinary amount of interest which this method of therapy has excited, bears testimony to the value of Dr. Hall's book as an exposition of its application.

The volume may be considered under three headings. The first nine chapters deal in a simple and readily comprehensible manner with the elementary facts of the physics, physiology, pathology, biology, and hygiene of light. The subject is not entered into deeply or at all critically, but the information given forms quite an efficient groundwork for those desiring an intelligent knowledge of the essential facts. The second part, comprising four chapters, describes the forms of apparatus commonly used

and the technique of administration. The author is enthusiastically in favour of the tungsten arc, and finds it applicable to most conditions. The remainder of the volume deals with the many groups of diseases in which ultra-violet light treatment is advocated. If we were to advance any general criticism, it is that the value of these records would have been considerably enhanced if we had heard a little more about the failures of the method, for these are as instructive as the successes. The mention of ophthalmological conditions is merely cursory. Cases are related of benefit to iridocyclitis, corneal opacities, and cataract. As far as the first of these is concerned we entirely agree with the author in his opinion that the value of ultra-violet rays may be extremely marked; as far as the last is concerned, we are surprised. The technique recommended is the radiation of the eye "through the closed lids"; and since we agree with the statement found on another page of the book that the shorter rays are completely absorbed by one-tenth of a millimetre of skin, while the longest only penetrate as far as the deeper cells of the epidermis, when we think of the interposed layer of muscle, the tarsal plate, the conjunctiva, and the cornea, we are left wondering how this treatment of cataract can act.

CORRESPONDENCE

HEREDITARY GLIOMA OF THE RETINA

To the Editor of THE BRITISH JOURNAL OF OPHTHALMOLOGY

SIR,—In a previous paper on this subject in the BRITISH JOURNAL OF OPHTHALMOLOGY, January, 1919, page 21, reference was made to the recording of further cases. I have now another case to report.

The patient was a girl, nineteen months of age, whose father now aged 34 years, had his right eye enucleated by Argyll Robertson thirty years ago on account of "something to do with the nerve."

There is no conclusive proof that the father's eye was gliomatous but I think this may be regarded as certain. The case was seen in private and complete details were not obtained.

Yours faithfully,

H. M. TRAQUAIR.

EDINBURGH,
February 13th, 1928.

NOTES

Appointments

Mr. RUPERT SCOTT has been appointed Assistant Surgeon to the Royal London Ophthalmic Hospital.

Miss MYRTILLA B. POWELL has been appointed Out-patient Officer, Royal London Ophthalmic Hospital, and Honorary Assistant Ophthalmic Surgeon, New Sussex Hospital, Hove.

Mr. JOHN MARSHALL has been appointed Visiting Surgeon to the Glasgow Eye Infirmary.

* * * *

Oxford Ophthalmological Congress

THE Eighteenth Annual Meeting will be held at Keble College, Oxford, from July 4 to 7. The programme is as follows:

July 5.—Symposium on "The Ultra-violet Ray," introduced by Professor Leonard Hill, F.R.S., and Mr. W. S. Duke-Elder.

July 6.—The Doyne Memorial Lecture by Professor Arthur Thomson.

The Annual Dinner will be held on July 5 in Keble College Hall.

Demonstrations will be held in the Scientific and Commercial Museums.

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Polish Ophthalmological Clinic

THE new Civil and Military Clinic of the University du Roi Etienne Batory of Vilna will be officially opened on April 22. The proceedings will be held at Vilna, Warsaw, and Posen. A commemorative plaque and bas-relief of Marshal Pilsudski will be inaugurated.

FUTURE ARRANGEMENTS

1928

April 19-21.—Annual Congress, Ophthalmological Society of the United Kingdom at the Royal Society of Medicine.

May 14-16.—Société française d'Ophtalmologie at the Faculty of Medicine, Paris.

June 8.—Royal Society of Medicine, Section of Ophthalmology (Annual).

July 4-7.—Oxford Ophthalmological Congress.

CONTEMPORARY OPHTHALMIC LITERATURE

American Journal of Ophthalmology. *January, 1928.*

JONES, L. W. Retinitis with massive exudates.
SOWERS, A. Retinitis punctata albescens.
VERVEY, J. W. Sclero-post-iridectomy, a rational operation in glaucoma.
GREEN, JOHN. Conjunctivo-plasty in certain corneal conditions.
DOHERTY, WM. BROWN. India rubber in anterior chamber: description of anterior chamber irrigator.
POST, M. HAYWARD. Sterilization of sharp instruments.
BLEDSOE, R. W. Perithelioma of the orbit.
WILDER, WILLIAM H. Necessity for correcting remediable eye defects in school children.
RING, G. ORAM. An ophthalmological clinic in Paris.
DUGGAN, J. N. Intravenous injections of mercurochrome in suppurative eye conditions.

Archives of Ophthalmology.

WILMER, W. H. Clinical aspects of ocular tuberculosis.
TÖRÖK, E. and REDWAY, L. D. A preliminary report of three cases of keratoconus.
TYSON, HENRY H. Lenticonus posterior.
BURKY, EARL L. and WOODS, ALAN C. Lens protein: new methods for the preparation of beta crystallin.
ELLIS, ZENAS H. Non-operative treatment of cataract with report on lens antigen treatment.
HECKEL, EDWARD B. Diphtheria antitoxin in large doses for sympathetic ophthalmia.
COHEN, MARTIN, KILLIAN, JOHN A., and KAMNER, MILDRED. Comparative chemical studies of the ocular fluids, of cerebro-spinal fluid and of the blood.

Annales d'Oculistique. *January, 1928.*

MAGITOT, A. Recurrent innervation and axon reflexes in ophthalmology, Pt. II.
LAFON, CH. Mydriasis and angio-spasm of the retina provoked by certain metallic intra-ocular foreign bodies.
NORDMANN, V. Endocrine cataract.
D'AUTREVAUX, Y. Some remarks on the use of Bailliart's tonometer.
SALVATI. The increase of lipoids in glaucoma and the influence of cholesterin on ocular tonus.

Archives d'Ophtalmologie. *January, 1928.*

BARD, L. The rôle of the "local sign" in the localization of visual images. Its application to the problem of the blind spot.
WEEKERS, L. Treatment of spasmodic entropion by alcohol injections into the terminations of the facial nerve in the lids.
NAROG, FRANÇOIS. Contribution to the pathology of conjunctival and corneal xerosis and of keratomalacia.
MEYER, JEAN. A case of optic atrophy with cupping and no hypertension.
RATEAU, V. A case of teno-synovitis following mumps.

Bulletin de la Société d'Ophtalmologie de Paris. *January 1928.*

CHEVALLEREAU. Congenital nummular cataract.
DUPUY-DUTEMPS and BLUM. Partial congenital ankyloblepharon.
KALT. Ocular tuberculosis or sporotrichosis?
KALT. Treatment of late corneal complications of trachoma.
ROCHON-DUVIGNEAUD and ONFRAY. Distant detachment of the macular retina in a case of sarcoma of the choroid.
CHAILLONS. Tuberculoma(?) of the posterior pole of the eye. Recovery.

MORAX. Penetrating wound of upper lid with injury to the superior rectus. Muscle sutured.

DUBAR, LAMACHE and SONN. The action of adrenalin on the pupil. Adrenalin miosis.

WORMS and BIDAULT. Conjunctivitis and kerato-conjunctivitis of nasal origin.

Archiv für Augenheilkunde. *January, 1928.*

ROELOFS, C. OTTO. Latent nystagmus.

GUGGENHEIM, IRMA and FRACESCHETTI, A. Refractometric investigation of the vitreous of the rabbit and man (under physiological and pathological conditions).

KUBIK, J. Experimental and clinical investigation into the hydrogen ion concentration of the aqueous.

WEGNER, WILHELM. The function of the human retina in experimental ischaemia.

SCHMERL, E. On the question of the actual blood reaction of glaucoma patients.

SCHMIDT, KARL. Investigations into disturbance of the capillary endothelium in glaucoma simplex.

Archiv für Ophthalmologie. *January, 1928.*

LUTZ, ANTON. On bi-nasal hemianopia. A comparative résumé of 84 cases in the literature and a description of two new observations.

HORNIKER, E. A new point of view in the pathogenesis of some degenerative changes in the eye.

TRUBIN, ANATOL. Adhesion of the lens to the cornea as starting point for a series of structural anomalies of the eye (on the pathogenesis of congenital hydrophthalmos, congenital corneal opacities, and lenticonus anterior).

SOFAR, KARL. On rise of tension following juvenile retino-vitreous haemorrhage and blocking of the central vein by tuberculous phlebitis, with observations on the genesis of tubercle of the retinal vessels.

TRON, EUGEN. Chemical researches into the nature of the intra-ocular fluids. III. Inorganic sulphur and phosphorus in the intra-ocular fluids and in the blood of cattle.

OHM. On nystagmus. XI. Optical nystagmus in retrobulbar neuritis of nasal origin.

ROGGENBAN, C. A research into the knowledge of the origin of the colour of the tapetum lucidum, in particular the tapetum fibrosum of mammals.

SAMOJLOFF, A. J. On optical registration of ocular pressure.

LEIRI, F. On optico-kinetically evoked visual illusions.
On perception during eye movements.

GASTEISER, H. and HIDANO, K. Experimental researches into the production of congenital eye defects.

GAEDERTZ, A. and WITTGENSTEIN, A. Researches into the passage of material from the blood into the aqueous, especially considered from the physico-chemical aspect. III. The permeability of the separating surface between blood and aqueous for diffusible kations. IV. The relative impermeability of the separating surface between blood and aqueous for colloids.

Klinische Monatsblätter für Augenheilkunde. *January, 1928.*

LEDERER, R. Peculiar ophthalmoscopic appearance in retinal ischaemia.

MULOCK HOUWER, A. W. Keratitis filamentosa and chronic arthritis.

STEIN, R. Thrombophlebitis of the opposite orbit and crossed abducens paralysis in otitis media. Statistics of the ocular symptoms of otitis media and their complications.

DWORJETZ, M. On the justification of the term "atrophia nervi optici."

SZILY, A. VON. On the operative treatment of keratoconus.

AXENFELD, TH. Keratoconus and senile cataract.

RÖTHLIN, E. On the question of the specificity of Ergotamin.

RÖNNE, H. On transitional forms between anomalous trichromatism and dichromatism.

ISAKOWITZ, J. On Cellitzer's work on physiological central astigmatism.

OLAH, E. The mechanism of injection mydriasis and the explanation of the phenomenon of the cat pupil.

ESSED, W. F. R. and SOEWARNO, M. On experimental myopia in apes.
KRASSMÖLLER, W. The physico-mathematical demonstration of the genesis of myopia according to Levinsohn.
KRANTBAUER, G. Multicoloured corneal tattooing chemically produced by silver nitrate and gold chloride.
VELHAGEN, C. A melanoma and a so-called minimal sarcoma of the choroid in the same eye.
SCHÖPFER, O. On abducens paralysis in the course of herpes zoster ophthalmicus.
ARON, FR. Injury to an eye from the poison of the common garden spider (*Epeira diadema Walek*).
PETERS, H. Loosening of Descemet's membrane in operations involving opening of the anterior chamber.
VON LIEBERMANN, L. Some practical lighting apparatus for clinic and consulting room.
SCHUSTER, P. Phthiriasis of the lids only.
WOLLENBERG, A. On the meaning of sclerotomia posterior.
Reclination of the ectopic lens—as complication of an attempted extraction of a forward dislocated mobile lens in a child.

Zeitschrift für Augenheilkunde. *January, 1928.*

KNUSEL, O. Vital staining in the human eye.
MYLIUS, K. Retrobulbar neuritis and its treatment with cocaine-adrenaline tamponnade of the nose.
SGALITZER, M. On the nature of the influence of X-rays on brain tumours.
HEINZ, WILL. On a case of vitreous haemorrhage after skull injury.
WEGNER, W. and ENDRES, G. On the connection between the intra-ocular tension and the hydrogen ion concentration of the blood.
SOFAR, K. Scattering of cholesterin in the anterior chamber as a cause for glaucoma in hypermature senile cataract.
LEDERER, R. An attempt to influence the course of tabetic optic atrophy.
SCHREIBER, Z. On the abnormal course of a retinal vessel, with observations on coloboma of the retina.
GLÜK, B. Experimental investigations into the appearance of the visual purple in jaundiced rabbits.

Archivio di Ottalmologia. *January, 1928.*

ANGELUCCI, A. Activating substances and vitamins in the treatment of a case of conjunctival adenoid tissue and corneal complications.
DE LOGU, A. Auto-haemotherapy and auto-serotherapy in the cure of trachoma.
FAZIO, G. "The Hemistereoscope"—a new apparatus for the diagnosis of simulated monocular amaurosis.
SMALTINO, M. Decompression in papilloedema (a synthetic review).

Bollettino d'Oculistica. *January, 1928.*

PANICO, E. Contribution to the study of hydrophthalmos.
NICOLATO, A. Considerations on the histopathology of three eyes enucleated for sympathetic ophthalmitis.
BIANCHI, M. Contribution to the knowledge of the pathology of the caruncle.
GENNARO, L. A case of total ethmoid empyema of orbital origin.